

JOURNAL of the American Veterinary Medical Association

FORMERLY

AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n.)

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The American Veterinary Medical Association

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SIOUX CITY, IOWA

JOURNAL

OF THE

American Veterinary Medical Association

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(Original Official Organ U. S. Vet. Med. Ass'n.)

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No. 1

THE DENVER CONVENTION

THE fifty-eighth annual convention of the American Veterinary Medical Association was called to order by President David S. White, in the Municipal Auditorium, Denver, on September 5, after an entertaining pipe-organ recital. The invocation was delivered by Rev. James E. Davis, pastor of the local Central Christian Church. The assemblage was officially welcomed to the city by the Hon. Dewey C. Bailey, Mayor of Denver, who related many interesting experiences of his fifty years in the cattle business, particularly those which he had with Texas fever in the early days when he trailed Texas cattle through Kansas and into Colorado. Colonel H. E. Bemis, of Ames, Iowa, responded happily and entertainingly to the mayor's address of welcome.

After several well-received vocal solos by H. W. Stanton, of Denver, President White delivered himself of a scholarly and well-prepared presidential address, outlining the work accomplished by the Association within the last year and predicting a steady growth for the future. This address will be found as the first paper in this issue.

The first business session of the convention was opened in the afternoon with the report of the Executive Board, followed by the election of new members, the reports of the

Secretary and of the Treasurer, and various reports of the different committees.

Monday evening the President's reception was held in the ball-room of the Albany Hotel, the headquarters of the convention. Dancing, with excellent music, followed until midnight, and many members availed themselves of this opportunity of rejuvenation.

SECTION PAPERS

On Tuesday morning the various sections of the Association met in joint session, beginning with an organ recital, and then proceeded with the reading of papers. Unfortunately many of those who were on the program failed to appear, but this was counteracted by the opportunity for more extended discussion of the papers of the authors present.

Dr. Jakeman, Chairman of the Section on Sanitary Science and Police, who presided at the combined meeting of the three sections, noted the need of familiarizing the public with the work of the veterinary profession. The fact is not appreciated that the livestock sanitary officer is a veterinarian. The veterinarian should be credited with his service in protecting human and animal health, in addition to being recognized as one who treats sick animals. Whenever possible he should cooperate with the medical man.

Dr. T. E. Munce stated that biological products are being used by veterinarians as a substitute for true prophylaxis, such as the primarily and fundamentally important sanitary measures. Prophylaxis is always possible to some extent, even without full knowledge of a disease, though this knowledge is needed for formulating the best prophylactic measures. The producer of food is a highly important factor in preventing animal diseases. Pennsylvania has a veterinarian devoting his time to disease prevention. The application of known measures will control most, if not all, of our transmissible diseases. Dr. Munce read a series of sixteen principles for disease control and recommended that a commission be appointed to study the subject of prophylaxis and report on it.

Drs. Records and Vawter presented a paper, read by the latter, on hemoglobinuria, and discussed the symptoms of the disease and reported the nature of the blood picture. There is a hemoglobinemia and a leucocytosis. The postmortem picture was given in detail. The bacteriological findings are of

especial interest. A number of bacterial forms may be isolated from various cases of the disease, but *Bacillus welchi* was the only one constantly found present wherever examination was made under suitable conditions, and is the only one with hemolytic properties. Administered by mouth to cattle, it was ineffective in producing the disease, but intramuscular injections produced a number of cases in cattle. Apparently there are some unknown contributing or predisposing factors in the disease, and it has a seasonal and regional incidence. Treatment was also discussed.

Dr. C. D. Marsh gave a general talk of an informal nature, illustrated by lantern slides showing poisonous plants and poisoned animals. He noted that whereas poisonous plants occur all over the United States, the losses in the West are much the more important, due to the conditions under which livestock is kept. Cattle are turned loose for months and drift over areas of poisonous plants, and sheep are handled by herders who occasionally herd them over dangerous areas through ignorance. Stock poisoning is usually the sequel to a scarcity of feed, poisonous plants not being eaten from choice as a rule. There are few remedies that are of use under range conditions. Dr. Marsh exhibited specimens of whorled milkweed, death camas, sneezeweed, rubber plant, high larkspur and aconite, and slides dealing with death camas, lupine, azalea, rubber plant, larkspur, sneezeweed, cherry and whorled milkweed.

Dr. Frederick Torrance's paper, which was read by Dr. Hilton, reported the results of Canadian measures for controlling the spread of hog cholera by garbage. The law prohibits the feeding of garbage away from the premises on which the garbage is produced, except under regulation and license. It is provided that such licensed persons must cook the garbage under suitable conditions and maintain a sanitary establishment. An outbreak of cholera is regarded as proof of violation of the law in the absence of evidence to the contrary. This law works well in controlling hog cholera. Since its passage, six years ago, 90 per cent of the outbreaks of hog cholera have been found to be due to violations of the law in regard to garbage feeding.

Dr. George H. Glover reported that there has been a greatly increased interest in the subject of municipal food inspection

among people in general if not among the veterinary profession. Such inspection is important in protecting the public health and therefore is more vital than streets, sidewalks, etc. Municipal inspection is feasible. The veterinarian must take an interest in this matter and other matters of public health. Dr. Glover gave a detailed account of the introduction of municipal inspection into Fort Collins, Colorado, noting the value of interesting the women's clubs in this matter.

Dr. Maurice C. Hall in his paper stated that we must take stock of our knowledge of treatments and preventive measures for the various parasitic diseases and adopt the most feasible and practical measures. In some cases we have good treatments and no practical prophylaxis. In other cases we have effective prophylaxis and no effective treatments yet known. Prophylaxis is often impractical in the control of such parasites as many of the nematodes of herbivores, where it is necessary to run these animals on pasture. The animals soil their feet with their feces and the parasites develop too rapidly to make pasture rotation at short intervals a practical control measure, owing to economic limitations. Under such conditions treatment is more practical and more important than any known prophylaxis.

Lack of time and space prevents the abstracting of the excellent addresses presented on the last two days of the meeting by Drs. S. Sisson, J. W. Adams, Fred M. Hayes, H. E. Kingman, O. E. Troy, R. H. Beaudette, F. H. McNair, Fred R. Jones, I. E. Newsom, D. J. Healy, Louis Santa Maria, W. J. Embree, George W. Stiles, Jr., and R. C. Reed, but they will be printed in the JOURNAL as speedily as possible.

ELECTION OF OFFICERS

The election of officers was the principal feature of the general session on Tuesday afternoon. Dr. Glover nominated Dr. A. T. Kinsley for President, while Dr. Eliason nominated Dr. T. H. Ferguson. When the ballots were counted Dr. Kinsley had 100 votes against Dr. Ferguson's 62, so the former was declared duly elected. Other officers elected were Charles G. Lamb, Denver, Colo., First Vice-President; J. F. McKenna, Fresno, Calif., Second Vice-President; W. H. Robinson, Portland, Me., Third Vice-President; W. A. Hilliard, Winnipeg, Canada, Fourth Vice-President; Hamlet Moore, New Orleans, La., Fifth

Vice-President; M. Jacob, Knoxville, Tenn., Treasurer. The Secretary and also the Editor succeed themselves.

The election of Dr. Kinsley to the presidency creates a vacancy on the Executive Board in the position of member at large. This vacancy may be filled temporarily by the incoming President, but the permanent member must be chosen by the ballots of the members present at the convention next year.

ENTERTAINMENT FEATURES

Tuesday evening banquets were held by alumni of the various colleges, as well as by the Shriners' Club and several other associations.

The one big feature of the meeting was the entertainment provided all day Wednesday by the 70-mile automobile drive through Denver's mountain park system, with a "beef-steak fry" at noon on Lookout Mountain, overlooking the town of Golden and adjacent to the last resting place of "Buffalo Bill," the Indian scout and buffalo hunter. The return was made by Bear Creek Canyon, one of the most famous scenic motor drives in the Rockies.

The wives and families of the delegates were given additional entertainment by an automobile trip through the city and surrounding sections on Thursday afternoon, and a card party Tuesday night. They were likewise present in large numbers at the general session Wednesday evening, when Prof. H. R. Smith, of Chicago, spoke on the subject of tuberculosis eradication and displayed the motion picture "Out of the Shadows," a film which shows the efforts being made to combat the spread of tuberculosis among cattle. Other films shown included the subjects of hog cholera control, tick eradication and Federal meat inspection.

THE LADIES' AUXILIARY

Members of the Ladies' Auxiliary of the Association met Tuesday afternoon at the Albany Hotel. After prayer by Mrs. C. E. Cotton, of Minneapolis, Mrs. G. H. Glover, of Fort Collins, welcomed the members to the city. The President's address was made by Mrs. A. T. Kinsley, of Kansas City, while Mrs. J. P. Turner, of Washington, D. C., who was unable to be present, sent an excellent paper which was read by the Secretary.

ELECTION OF SECTION OFFICERS

After the programs of the various sections of the Association had been completed the sections proceeded to the election of their officers, with the following result:

Section on General Practice—W. E. Muldoon, Chairman; H. E. Kingman, Secretary.

Section on Sanitary Science and Police—R. C. Reed, Chairman; H. Preston Hoskins, Secretary.

Section on Education and Research (formerly Section on College Faculties and Examining Boards)—C. P. Fitch, Chairman; L. W. Goss, Secretary.

PLACE OF NEXT MEETING

Through a real booster's talk by Mr. Hatfield, of the Chamber of Commerce of St. Louis, an invitation was extended to the Association to hold its next meeting at St. Louis, while both Drs. Eliason and Ferguson solicited the next meeting for Madison, Wis. At this session there happened to be only 86 members present, a slight majority of whom favored recommending to the Executive Board that the latter place be selected. However, the final selection will be left in abeyance until the next meeting of the Board in December.

ATTENDANCE AND MEMBERSHIP

During the convention there were 337 persons registered, of whom 217 were members of the Association. The number of new members elected at Denver was approximately 250, but this was not considered satisfactory, so a committee on new members was appointed, consisting of the President, the Chairman of the Executive Board, the Secretary and the Editor, to work out some definite plan for increasing our membership. Suggestions will be gladly received by this committee. Commissioner of Agriculture Whittlesey of Connecticut was the only honorary member elected this year.

Taken as a unit, the convention combined one of the most instructive and entertaining meetings ever held, and a large number of the delegates declared that from both an educational and a social point of view it was of vast benefit to them. The cool, bracing weather was also deeply appreciated, especially by those who came from sections of the country where the past summer's heat had been unusually intense.

OUR NEWLY ELECTED PRESIDENT

DR. ALBERT T. KINSLEY, who was elected President of the American Veterinary Medical Association for the ensuing year at the meeting held in Denver, Colorado, September 5 to 9, needs no introduction to the readers of *THE JOURNAL*. Through his connections with the Kansas State Agricultural College and the Kansas City Veterinary College, his activities in the interests of the veterinary profession and the veterinary organizations of which he is a member, his able addresses and liberal contributions to veterinary literature, his ability as a teacher, and his geniality, he enjoys a wide acquaintance among the members of the veterinary profession in this country and is recognized abroad as an authority on veterinary matters.

Dr. Kinsley was born of English parents at Independence, Iowa, February 26, 1877. His early education was obtained in the public schools of the State where he was born. In 1899 he graduated from the Kansas State Agricultural College with the degree of B. S. Throughout his collegiate course he displayed such marked aptitude that after graduating he was employed by the College as instructor in bacteriology. He remained at the College from 1899 to 1901, where, in connection with his duties as instructor, he continued his studies, and was awarded his M. S. degree in 1901. After leaving the Kansas College he took special work at the University of Chicago, after which he entered the Kansas City Veterinary College, graduating with the class of 1904. Immediately after graduation he accepted the chair of pathology and director of the museum in that college. In addition to teaching bacteriology and pathology from 1904 to 1918, he was President of the Kansas City Veterinary College from 1912 to 1918.

Dr. Kinsley has been an active member of the A. V. M. A. for many years and was honored with the vice-presidency in 1909-10. He is a member of the Missouri State Veterinary Medical Association and the Missouri Valley Veterinary Medical Association, and served as president of the latter in 1909-10.

In connection with his duties as an educator, Dr. Kinsley has written many valuable articles, including "Zinc Poisoning in Cattle," "Wound Healing," "The Significance of Pathology to the Practitioner," "Porcine Tuberculosis," "Ocular Epithelioma," "Epithelioma Contagiosum," "Equine Infectious Anemia," "A Disease in Chickens," "Cornstalk Disease," etc.



DR. A. T. KINSLEY

He is also the author of a work on "Veterinary Pathology" and another on "Diseases of Swine."

Dr. Kinsley is thoroughly fitted for the responsible position in the A. V. M. A. to which he has been elected. He has the backing of the organization, and THE JOURNAL wishes him a successful administration.

THE ADDRESS OF THE PRESIDENT¹

By DAVID S. WHITE

Columbus, Ohio

IT IS REQUIRED by our Constitution that the President deliver an address. This imposes an arduous but not unpleasant task. In the political world the President of a country or the Governor of a State delivers, on his installation into office, an inaugural address in which he sets forth, sometimes reiterating campaign pledges, his policies. This places him at a decided disadvantage, for before he can realize the many situations which will confront him and the many important decisions he must make, he is compelled to commit himself in advance. We have adopted the safer plan requiring that the President's address be delivered at the end of his term of office and after he has experienced a year of service. I do not know that the address is ever taken very seriously by the rank and file of the members. I think sometimes it is looked upon as a part of the perfunctory routine, and perhaps by a minority as the "swan song" of the incumbent.

To become president of an organization such as this I look upon as a great honor and one which should be conferred only upon a member who through the years has shown his devotion to the profession and to the Association by having given through them some service of benefit to mankind. In looking over the list of my predecessors in office, I believe this has been the aim and object of the membership. I therefore take this occasion to thank each and all of you for this honor. I have tried to accept it in the spirit in which it was given and to render what service I could to the cause for which we stand. If I have failed it is because I lacked in ability and not in inclination.

The term of office is too short for any given President to make an impress upon the organization. According to our Constitution he is elected for one year only and may never hope of reelection. In a democracy, such as our Association should be, this is probably a wise provision. But nevertheless the continuous

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

administration of the affairs of the Association must be left to other officers whose terms are more permanent. While it is admitted that an absolute despotism is an ideal form of government, provided a good despot is available, the experience of the world has demonstrated it to be too risky to be adopted generally. Despots are always human and suffer from the frailties



DR. DAVID S. WHITE

Retiring President, American Veterinary Medical Association

of human nature, which frailties, as history shows, seemed to be intensified in some despots. Civilized humanity, therefore, has turned from absolute monarchy to constitutional monarchy, and from constitutional monarchy to democracy. While admittedly much has been surrendered to make these changes, the least of the evils seems to be a democratic form of government. I do not mean to advocate that either the term of office of your President be lengthened or his reelection be made possible. I do, however, wish to draw attention to the facts which in part explain the innocuous desuetude into which your President may seem to sink.

Fifty-eight years ago a small group of men, graduates of veterinary colleges, met together in an eastern city and founded this Association. They builded better than they knew. In those days veterinary medicine in this country was in a most primitive state. The value of livestock was low and what little veterinary service was required was furnished by the illiterate, self-trained empiric. In no State did laws exist governing the practice of our profession, and with the exception of two or three schools, each offering a most abbreviated curriculum and each dependent entirely upon student fees for its support, there were no opportunities to gain a veterinary education. State veterinary medicine did not exist. The only thing that lay before these far-seeing charter members was their faith in the future. During the half century which has followed some of them have lived to witness the changes which time has brought and to realize their aspirations and hopes. Today this Association is the largest veterinary organization in the world. Laws controlling the practice of the profession now exist in practically every State. The private veterinary school which sustained the profession during its formative years has given way to institutions of veterinary learning supported by the people. There have also developed National and State Bureaus of Animal Industry, which have as their function the control and eradication of animal disease, now carried on, for the most part, through well planned and directed organizations. The results have justified their existence. In connection with them veterinary research has been continuous and fruitful. Today no countries in the world enjoy greater freedom from animal plagues than do the Dominion of Canada and the United States.

One of our longest fought battles against disease was in the nineteenth century when contagious pleuropneumonia of cattle was conquered. One of our most successful campaigns was directed against foot-and-mouth disease, which had been an intermittent visitor since 1870.

In 1914 the most widespread outbreak in the history of the country occurred. Within three months the disease spread over twenty-one States and the District of Columbia. But notwithstanding the extraordinary communicability of the disease and the fact that the rank and file of the profession had had no previous experience with it, and that many people in authority, ignorant of its powers of devastation, opposed our measures of eradication as being too drastic, the disorder was finally compelled to desert our shores.

With Texas fever there has been a gratifying decrease in the geographical areas infested with the tick harboring the protozoön of this disease. If our well-directed efforts are continued we are justified in assuming that this cattle plague will cease to exist in this country. The importance of this work to the cattle raiser of the Southern States can not be overestimated. It has removed from him the handicap of a restricted market and permitted him to infuse into his herds the best blood.

Dourine, which for a time threatened horse breeding, has also been conquered. We now know how to control hog cholera.

The control and eradication of tuberculosis has resolved itself into a purely economic problem. The scientific facts underlying the mechanism of control are now well established. About the accredited herd plan I am optimistic. I believe it will eventually work out, especially since the cooperation of the layman has been secured. In this connection a certain amount of opposition has come from the veterinary practitioner, but I do not anticipate that this will continue when the organizations of official veterinarians have been functioning long enough to learn the part which they should rightly play in the game and the encroachments upon private practice become less obvious. Any scheme of disease control which ignores the reputable practitioner is faulty. On the other hand, experience has shown that unsupported individual effort, no matter how skilfully it may be applied, finds the restrictions imposed too great to accomplish the best results.

Once we secure the hearty cooperation of the State and National Governments, represented by official veterinarians, the veterinary practitioner and the layman, a successful program of disease control and eradication can be put into effect. Most of the difficulties which we as a profession meet in battling against animal disease are due to misunderstandings, ignorance and sometimes prejudice. However, as right must always prevail in the end, so may we expect that when hearty cooperation is obtained among the three groups mentioned, the difficulties will be removed and the chaos changed to cosmos. It takes time and energy to develop any piece of smooth-running machinery. The chief engineer of a company building the most expensive automotive vehicle in this country told me that it required six years "to get the 'niggers' out of the motor." It can not be expected, therefore, that in a few months a perfect mechanism of disease control can be designed and put into effectual operation. Disease control means war, and war of necessity makes it unpleasant for many people.

The past half century marks the formative period of the veterinary profession on this continent. The process of its development, like that of the other professions, has been evolutionary. It is still evolving. None of us will ever live to see it perfected.

This Association is the only mechanism we have to bring together the leaders of the profession in North America to exchange experiences, witness demonstrations and formulate policies. It has always been my desire to see this Association dominate veterinary policies and politics on this continent. That we have not to date fully accomplished these things has been largely due to our intense interest in mere technical details and the internal politics of the Association. These things are perfectly natural in an organization representing a profession still in its swaddling clothes. Fifty years is a long time in the life of an individual but is only a day in the development of a profession.

The future of this organization will depend upon the leadership of those elected to conduct its affairs. Our leaders must be men, therefore, of broad vision and not representative of only one of the various phases of professional activity. It would be a mistake to permit this Association to be dominated by the teacher interested only in teaching, the research man who sees

nothing beyond his narrow field, the vender of biological products imbued only with the spirit of commercialism, the official veterinarian who lays all stress on regulatory measures, or even the veterinary practitioner who cares for naught but the art of practice. Although we can not all be experts at teaching, research, commercialism, officials, or practitioners of veterinary art, we can be, every one of us, veterinarians. And of veterinarians only should this organization be made up. Therefore I am asking each group representing a phase of veterinary medicine to go over into the camps of the other groups, learn their problems, see what they are actually up against and endeavor to meet them half way in any act of cooperation which will contribute toward making us a united whole. As the President of the British Veterinary Association puts it: "No profession, however large, can be really powerful without unity; and in a small profession unity is one of the essentials of existence." We should strive, therefore, to forget our petty differences, trivial rivalries and little jealousies and become more tolerant of the opinions of our colleagues in order that complete unity of purpose and unity of action may be realized. For without these things we can not as a profession bring to bear our full strength, and without this we will not be able to attain our legitimate goal.

I can not emphasize too much the importance of unity. While admittedly we have made progress in this regard in the last half century, nevertheless I firmly believe it would have been more rapid and fruitful had we been more firmly united through the years which have passed. Our sister profession, the medical, has suffered from the same lack of unity as we. The tendency to split off into cliques and factions has been common to it. Lack of unity and hideboundness has injected into the medical profession various cults and sects which today are sapping the vitality of the physicians belonging to the so-called regular school. The difference of opinion among medical men in technical matters and the tendency for one physician to berate another has had its effect upon the laity. Those without the pale stand nonplused at the situation of the doctors continually disagreeing. Consequently when certain medical cults and sects ask of the laity modifications in the medical law, which gives to them a legal professional status, it is too often

granted. In our profession the situation in this regard is much less complex. But we also have our troubles and dissensions although not of the same kind. I think sometimes we are too apt to clique off into little, self-interested groups, each with its own leader and each at cross purposes with the other groups. A strong nation has never been built out of a conglomeration of disunited States, each an autonomous entity and independent of the rest. What would be our history as a nation today had the States Rights doctrine of the Confederacy won over the Nationalism of the Federacy during the Civil War? In place of a mighty republic, now the strongest on earth, we would find this continent occupied by a number of disintegrated sections, each with its own form of government and quarrelling with its neighbors. Firmly united the veterinary profession is already weak enough to fight the battles which it must fight in order to carry on its legitimate work.

Because of certain dissatisfactions, which may be in part justified, there seems to be a tendency among certain groups of veterinarians to abandon already established organizations and initiate ones of their own. This is deplorable. I do not believe that any group of veterinarians representing only one or two of the various phases of the profession can divorce themselves from the rest of us and go it independently. Practice, research, teaching, regulatory work and the military must be ever interwoven and overlapping. Among them there can be no marked line of cleavage drawn. They are interdependent. One can no more think of removing as a body from the American Veterinary Medical Association or from any State organization a group of veterinarians representing a phase of professional work and expect the mechanism to function any more than one could hope to see a motor car operate from which the transmission had been removed. We must remember the danger of a Mexican political policy, a scheme of self determination run riot, a crippling affliction which hurts all of us and in the long run does none of us any good.

I have therefore taken as my theme for this message the doctrine of unity. I have done so in the hope that this acorn of desire and appeal would fall upon fallow ground, where, nourished by the soil of harmony and watered by the rain of cooperation, it would sprout and grow and develop into a mighty oak

whose branches would reach upward to protect against the sun of rancor and discord, and whose every part, even to the smallest twig, would be a component of a beautifully organized whole able to resist the storms of summer and the tempests of winter. Whether it stand in the forest or in the open it represents not only a thing of beauty but also an object of usefulness.

To each of the following items I beg leave to briefly draw your attention:

Schools.—The greatest need of the profession today, in my opinion, is men with education and the ability of leadership. While I believe we possess a few of this type, as yet not enough have joined our ranks to stabilize our efforts. Our recruiting station is the veterinary school. According to the discipline of the profession each member must be first a graduate of an accredited college. Due to influences, some of them emanating from our own ranks, the student population of our schools has suffered a material reduction, especially in the past five years. The following table shows the number of students matriculated in each of the State veterinary schools and the single accredited private school in November, 1920:

Alabama Polytechnic Institute	53
Colorado Agricultural College	88
Georgia State Agricultural College	21
Iowa State Agricultural College	94
Kansas State Agricultural College	61
Michigan Agricultural College	21
New York State Veterinary College (Cornell)	78
New York State Veterinary College (New York University)	23
Ohio State University	106
Ontario Veterinary College (Toronto, Canada)	95
University of Pennsylvania	30
Texas Agricultural and Mechanical College	18
State College of Washington	22
Indiana Veterinary College	136
Total	846

It would seem passing strange that in a country of one hundred and ten millions of people, with livestock valued at close to ten billions of dollars, only eight hundred and forty-six young men desire to pursue a course in veterinary medicine.

There has been a tendency to increase the number of veterinary schools supported by the people. As a matter of State pride individual commonwealths have seriously considered the establishment of such institutions. It would be unfortunate

should the number of veterinary schools increase until there came from the people a greater demand for this type of education. While there was an excuse for the maintenance of a *private* veterinary school of mediocre caliber, there can be no reason for the existence of a *State* veterinary college which is in teaching staff, housing and facilities not in keeping with the increasing demands of animal husbandry. As practically all State-supported schools will be located at land-grant colleges, those having but few students will receive of the legislative appropriations granted the institution but a scant share. Medical education is an expensive thing. The cost of turning out a well trained medical man greatly exceeds that of producing a man of law, divinity, engineering or agriculture. When the distribution of the funds of an institution is on the basis of "the greatest good to the greatest number," obviously a poorly attended veterinary department will suffer financially. It would be far wiser if those States ambitious to support a school of veterinary medicine would give only the first two years of the curriculum and in a tangible way assist the student who wishes to complete the course at an already well established veterinary school. This device would not only be more economical for the initial State but would tend to make the best schools more populous in student numbers and better endowed by the States in which they are located.

I believe it is the duty of every veterinarian to encourage rather than discourage, as some are doing, young men of the right type to enter the profession. The emoluments of the profession are today greater for the expert than they ever were, but for the man of mediocre type they often do not offer sufficient remuneration to reimburse him for the time and money spent at school, and from now on they never will. There was a day when "any fool could farm." There was also a day when a man of no education, meager training and little or no dexterity in the art of veterinary practice could make a good living or at least a fairly easy livelihood. That day is gone.

The Army.—While the situation in the Army is very much better than it was prior to the great war, the Veterinary Service has not yet been given the authority to do its own job nor has it attained the stable status of the other staff corps. The Veterinary Corps has still at its head a medical officer, and I am in-

formed that veterinary officers in the field are under the immediate supervision of medical officers. Concerning both of these situations I think there exists in the profession a unanimity of opinion. That a veterinary officer should be at the head of the Veterinary Service of the United States Army there seems to be a general agreement. Leading veterinarians of the country, both military and civilian, seem to feel that the absence of such an arrangement places a decided stigma upon a profession which in civil life has been able to run its own show whenever it has been given the authority to do so. So much for the diagnosis. The treatment, however, does not seem so simple. The Veterinary Service of the Army up until after we entered the great war had been criminally neglected. The older veterinarians, who held the rank of a field officer, had never been given the opportunity to develop themselves as administrators. They were regimental officers, each the technical advisor of his commanding officer. The idea of an organized service had never been seriously considered even by many of the ranking veterinary officers. However, this is but a repetition of the history of the staff corps services in our Army, each of which attained its present status only after years of heroic endeavor. It must therefore be expected that the Veterinary Service must pass through practically the same evolutionary stages which other noncombatant services have passed through. Furthermore, a military establishment which remains too long at peace tends to degenerate into a state of conservatism rarely approached in civil life. This conservative mental attitude harbored by many officers of high rank and influence obviously make progress for the new-created veterinary service extremely difficult. The British Army, which gives to its veterinary officers greater authority than any army in existence, and which for this reason has been able to create the most efficient animal salvage corps the world has ever known, offers from a veterinary standpoint many advantages over our own. In the first place it made the veterinary service attractive to young men not only in rank and pay but in opportunity to see the world and some action, as this army is fighting somewhere nearly all the time. It took Great Britain, however, nearly half a century and two great wars to create its army veterinary service. It will probably require of us as long a time.

I have been in correspondence with Major General Ireland, Surgeon General of the Army, in regard to this matter, and have offered some suggestions which in time should work out to the benefit of the Veterinary Service. In my opinion General Ireland thoroughly understands the situation, is in sympathy with the veterinary officer and his problems, and will eventually be able to set the Veterinary Service on its feet. It would seem to me logical, inasmuch as no veterinary officer of sufficient rank is available to act as director, for the Surgeon General to select from among the veterinary officers one who with opportunity and experience would make an efficient director and who eventually could be placed at the head of the Veterinary Corps. If something of this sort is not done, I do not see how we can hope to develop a veterinary officer for this position. I do not believe any attempt has been made to do this thing but I do feel the present incumbent should have an understudy, a veterinary officer who could take his place when he is relieved. I have the highest regard for Colonel Morse. He is a good administrator, a broad-minded gentleman, and has proved an excellent "wet nurse" for the veterinary baby. However, it is to be hoped that this youngster will soon be weaned and taught to eat solid food.

In my opinion it will be some time before the Veterinary Corps can become a separate organization. To attempt to make it one at this time would be disastrous. For the present and until it has worked out its salvation and attained an undisputed status in the Army it should remain in the Medical Department. For many reasons it is better off there than it would be in any other department.

National Research Council.—Pursuant to the action of this body, a member of it, a veterinarian of national reputation in research and experiment, has been appointed a member of the National Research Council. I believe this to be a good thing. The more we mingle with scientific folk outside the profession the better will the profession be recognized and esteemed by these folk. Furthermore, many problems in medicine of direct interest and usefulness to the human being can be best worked out through cooperation with the properly equipped and trained veterinarian.

National Narcotic Law.—A communication has been received

from the National Committee, representing the professions of medicine, dentistry and pharmacy, at work drafting a new national narcotic law, requesting that this organization also be represented. It would seem fitting, therefore, for us to take action in order that our rights and privileges be looked after when this matter is being given consideration.

General Anesthesia Law.—The Blue Cross Society has requested that this Association use its good offices to create a sentiment which will lead eventually to the passage of State laws requiring that general anesthesia be employed in all major surgical operations upon animals. For practical reasons the castration of animals is excepted. A similar law has been enacted in England. Such legislation, it is thought by the Society, would, among other things, tend to limit the number of major surgical operations performed by empirics.

Permanent Secretary.—It has been voted to authorize the Executive Board to make the office of Secretary more permanent, probably combining with it the editorship and management of the JOURNAL of the Association. This matter has been given careful consideration by the Executive Board, whose report will give the results of their deliberations regarding it.

United States Meat Inspection Service.—Influences are at work to transfer the Meat Inspection Division of the Bureau of Animal Industry to a Department of Public Welfare. The transfer is urged on the grounds of economy and efficiency. As it looks at this distance, there lurks within the danger that national meat inspection would be taken out of the hands of the veterinarian and placed under the supervision of a physician. The transfer would also divorce from the Bureau its largest division and very probably would lead to expensive duplication in laboratory facilities and equipment. In the light of our present information, the step seems inadvisable both from the professional and lay standpoints. It is certainly the duty of this Association to investigate thoroughly this important matter, and to do so before the transfer is made, in order to be in a position to prevent it if it is to work injury to the profession. This is a national problem entirely within the province of this Association to consider.

It is hoped that you will enjoy a successful meeting both from the standpoints of acquiring information and at the same time

most healthful recreation. You are being entertained in America's great playground, the mountains of Colorado. You are among the biggest hearted, most whole souled and hospitable people in the world—the people of the Great West. I trust, therefore, you may not only gain from the literary programs arranged for you but may also enjoy yourselves to the utmost as guests of the profession of this great State.

THE HORSE FOR STREET CLEANING

Director Frank H. Caven of the Philadelphia Department of Public Works has advanced ideas on the subject of street cleaning and rubbish collection.

His plans for the erection of destructories for the odorless cremation of street refuse is evidence of this fact.

This is the electric age—the “Johnny-on-the-spot” era of efficiency.

It is the period when efficiency engineers flourish and by-products are the creators of greater wealth than the original article of production.

Notwithstanding this the experimental conclusion of the Director and his force of engineers is that it is greater economy to spend something like \$800,000 for trucks, wagons and horses with which to start a city-wide street-cleaning program than to put the same amount of money into costly gasoline trucks, dump carts and auto machinery.

A tremendous upkeep is the principal argument against motor vehicles in street cleaning.

With the construction of destructories long hauls necessitated by far-distant dumps will be eliminated. A team of horses for short hauls is more economical than the electric vehicle, at least at the present stage of development in street cleaning.

About 1,400 horses are required to keep the city streets clean. This includes teams for the collection of rubbish and garbage.

These horses are used to move 21 flushers, 57 trucks, 515 wagons, 100 machine brooms and 50 sprinklers.

If the Department of Public Works went into the auto ash collection scheme over 1,000 motor-driven vehicles would be required to keep the city clean.

GARBAGE FEEDING IN RELATION TO THE CONTROL OF HOG CHOLERA¹

By FREDERICK TORRANCE

Veterinary Director General, Canada

GARBAGE as a source of hog cholera had been under suspicion for some time previous to the year 1912, when Dr. C. D. McGilvray read a paper before this association on the subject. He gave particulars of several outbreaks in the Province of Manitoba, where every other source of possible infection could be excluded, and only garbage remained as the probable infective agent. The presence in the garbage of uncooked scraps of pork which might have come from hogs affected with incipient hog cholera was suggested by Dr. McGilvray as the cause.

The statement that hog cholera might be conveyed in this way was received with some incredulity at the time, but experience and experiment have confirmed the result which he reached by a logical inference.

The Health of Animals Branch of the Department of Agriculture, dealing with hog cholera as it made its appearance from time to time in various parts of Canada, accumulated a lot of evidence that garbage feeding was a very real source of danger and should be controlled if possible. A new regulation was therefore made and became law on April 27, 1915. It is as follows:

"The feeding of swine upon garbage or swill, either raw or cooked, obtained elsewhere than on the premises where fed, is prohibited, unless special permission in writing is first obtained from the Veterinary Director General."

Feeders of garbage were notified to make application for a license and required to sign an agreement as follows:

"In consideration of the granting of a license to me, I hereby agree (1) to boil thoroughly all garbage before feeding it to swine, and to prevent my swine from having access to uncooked garbage; (2) to maintain my hogs in a clean, sanitary condition; (3) to sell no hogs except for immediate

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

slaughter; and (4) to notify the veterinary inspector without delay if sickness appears among my hogs."

On receipt of a signed application an inspector is detailed to visit and report on the premises, and no license is issued unless the premises are fairly such as can be kept clean and sanitary and are provided with the appliances necessary for cooking the garbage. For those keeping only a few pigs, up to twelve but not more, an ordinary food boiler was considered satisfactory. For owners having any number in excess of twelve we require a steam boiler and vats of sufficient capacity for the size of the herd.

Inspection of licensed garbage feeders is carried out by a staff of lay inspectors who visit the premises from time to time and report on the conditions as they find them.

If a report shows that a garbage feeder is neglecting to cook the garbage, or failing to boil it sufficiently, or is keeping his premises in a dirty, insanitary condition, he is given a warning, and if conditions are not made satisfactory at once his license is cancelled. The inspectors are constantly on the lookout for persons feeding garbage without license, and either warn them to procure a license without delay or else action is taken to have them brought before a magistrate and a fine imposed.

In case a lay inspector should find some hogs sick he immediately reports to a veterinary inspector, who visits the cases, makes a diagnosis and deals with the outbreak as circumstances require. If the disease is hog cholera, the affected hogs are slaughtered, the hogs in contact are serum treated and the premises placed under quarantine. The hogs on neighboring premises are visited and if deemed necessary by the inspector they too are serum treated and the premises quarantined.

In Canada we pay compensation for hogs slaughtered by order of an inspector for the control of a contagious disease. Compensation is limited to two-thirds of the valuation, which must not exceed \$20 for a grade or \$75 for a purebred pig. When hog cholera breaks out on a licensed garbage feeder's premises it is assumed that he has failed in his duty to cook the garbage properly or to prevent hogs from gaining access to it before it is cooked. Compensation is therefore with-

held unless it can be shown that the infection came from some other source than uncooked garbage.

This system has now been in operation for over five years and is found to work well. It has not altogether wiped out hog cholera, but it has enabled us to get early information of outbreaks and by dealing with them promptly to prevent their extension to adjoining premises. The frequent inspection and the insistence on sanitation have had a marked effect in improving the cleanliness and comfort of the swine kept on licensed premises and have helped to remove what was often a nuisance in the outskirts of a city.

A comparative statement of five years before and five years after this system was adopted will indicate the progress made. The first period is from April 1, 1909, to March 31, 1915; the second from April 1, 1915, to March 31, 1921:

	First period.	Second period.
Total number of outbreaks.....	1,426	742
Total number of swine slaughtered	42,663	19,709
Valuation of swine slaughtered.....	\$368,783.81	\$247,901.70
Compensation paid for swine slaughtered	245,455.72	141,545.43

It will be noticed that the number of outbreaks has been practically cut in half. Compensation would have been correspondingly reduced but that during the first period the maximum valuation was \$15 and \$50 as against \$20 and \$75. This increase was made in consequence of the claims of live-stock owners that the higher market prices of cattle and hogs entitled them to a higher rate of compensation.

The improvement in the hog cholera situation since the licensing of garbage feeders was begun is better shown perhaps by the figures for each of the five years:

Year.	Outbreaks.	Number of hogs killed.	Com-pensation.
1916.....	290	5,700	\$33,699.95
1917.....	90	4,623	30,497.59
1918.....	62	2,212	13,031.20
1919.....	52	2,163	23,342.74
1920.....	92	1,642	19,001.71
1921 (4 months).....	5	81	198.00

In a country as large as Canada these results have not been attained without exciting opposition and sometimes active an-

tagonism. The class of persons engaged in this occupation is not noted for intelligence. Some of them are foreigners to whom our laws are strange. Our inspectors have sometimes been met with threats and even physical violence. We have persisted, however, and have not hesitated to invoke the law whenever less drastic methods failed. During the period covered by this paper we have instituted sixty-three prosecutions and secured fifty-nine convictions, chiefly for the offense of feeding collected garbage without a license.

A final word as to the connection between garbage feeding and hog cholera. We have records of 742 outbreaks of hog cholera of which all but 75 were attributable to this cause. In other words, 90 per cent of the hog cholera we have had in Canada during the past five years had its origin in the garbage pail.

Our system is working well. We now have 471 licensed garbage feeders and so far as I know not a single case of hog cholera in the whole of Canada.

JAPANESE RULES OF THE ROAD

(Promulgated in Tokio)

1. At the rise of the hand policeman stop rapidly.
2. Do not pass him by* or otherwise disrespect him.
3. When a passenger of the foot hove in sight, tootle the horn trumpet at him, melodiously at first, but if he still obstacles your passage tootle him with vigour and express by word of mouth the warning, "Hi, Hi."
4. Beware the wandering horse that he shall not take fright as you pass him. Do not explode an exhaust box at him. Go soothingly by.
5. Give big space to the festive dog that shall sport in the roadway.
6. Avoid entanglement of dog with your wheel spokes.
7. Go soothingly on the grease as there lurk the skid demon.
8. Press the brake of the feet as you roll round the corners to save the collapse and tie-up.—*Journal of the American Medical Association.*

RESULTS FROM IMMUNIZING CATTLE AGAINST ABORTION ¹

By F. B. HADLEY

University of Wisconsin, Madison

THE one question about bovine contagious abortion that livestock men and veterinarians are asking more often than any other today is in regard to methods of establishing immunity against the disease. Although there is yet much to be learned about the subject, it is certain that the experimental work which has been conducted to shed light on the practicability of establishing an artificial type of immunity has demonstrated the possibility of this means of control.

Since extensive, adequately controlled experiments have been conducted in England, Germany and Wisconsin with several different immunizing products, each of which has given somewhat different results in the hands of the various investigators, it should be interesting to compare the results, as the countries in which the work was done are widely separated. In this way it seems that the controversy that exists relative to the efficiency of these products as aids in preventing contagious abortion may, in a measure at least, be settled.

Three distinct biologic products have been employed in these experiments. These have been used alone as well as in various combinations. They are (1) a bacterin consisting of dead abortion bacilli; (2) a vaccine consisting of living abortion bacilli; (3) an immune serum produced by giving cows large and repeated doses of abortion bacilli, then bleeding them and recovering the blood serum.

It is significant that the product containing the dead abortion bacilli is recommended almost exclusively by commercial firms who are its chief exploiters. Some of these firms claim astonishing results from the use of abortion bacterin, but have no reliable data to substantiate the claim. Certain manufacturers go so far as to guarantee certain results from the use of their abortion bacterin. Claims of this kind must be great exaggerations, if results reported in this paper are authentic.

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

It is charitable to believe that the exaggerated claims have been based on the fact that bacterins have given such excellent results in typhoid fever of man, rather than upon their actual use in veterinary practice as an immunizing agent against contagious abortion.

The abortion vaccine has been used for creating immunity against abortion on the strength of favorable results secured from the use of a similar product in certain other infectious diseases of animals. Theoretically it should be capable of stimulating the production of abortion antibodies in sufficient amounts to prevent any abortion bacilli, that may subsequently gain entrance to the body, from producing disease.

The immune serum has been used alone to a limited extent only, as trials showed it to be of little value. It has been employed simultaneously with both the dead and living abortion bacilli; also to sensitize the live organisms for the purpose of preparing the as yet little used products known as abortion serovaccine and serobacterin.

In Table 1 is given a summary of the results of an investigation conducted by veterinarians for the Board of Agriculture of England in an attempt to prove or disprove the value of two of the products under discussion. The herds presented had all experienced severe losses from abortion just prior to treatment.

TABLE 1.—RESULTS OF IMMUNIZING CATTLE AGAINST ABORTION IN ENGLAND

Method of conferring immunity	Total number of animals	Less those which died, were barren or were sold	Number aborted	Per cent aborted	Number calved correctly	Per cent calved correctly
Immunized with live bacilli.....	594	594-101=493	732	6.5	461	93.5
Controls not immunized.....	472	472-40=432	101	23.4	331	76.6
Immunized with dead bacilli.....	146	146-36=110	23	21.0	87	79.0

The following conclusions seem justified from the data presented in Table 1: (1) That immunization with live abortion bacilli (vaccination) resulted in conferring immunity on 93.5 per cent of the cattle treated in herds where over 30 per cent of them aborted before the experiments began. (2) That over 23 per cent of the untreated controls aborted. (3) That treatment with the dead bacilli conferred little if any immunity, for the percentage of abortions in this group was practically the same as in the group left as controls. This means that al-

though the abortion bacterin caused little or no harm, it did not prevent the occurrence of abortion with any degree of regularity or to any extent.

The men in charge of this series of experiments came to the conclusion that: (1) It is necessary to continue the inoculations for a time on infected premises after abortions cease to occur; (2) inoculations should be carried out in an infected herd until abortion has ceased, but if the herd is one which is restocked by buying in fresh non-pregnant animals, these animals should always be inoculated; (3) if pregnant animals are bought, they may reintroduce infection; (4) although very few animals which have been immunized for one pregnancy have aborted at subsequent pregnancies, it appears that if an animal is immunized for two pregnancies running, there is very little chance of the animal aborting afterwards.

German investigators have also conducted immunization experiments against contagious abortion on a relatively large scale. The results of this work are detailed in the *Arbiter aus dem Reichsgesundheitsamte*, 52 Band, Heft 3, in the following manner:

TABLE 2.—RESULTS OF IMMUNIZING CATTLE AGAINST ABORTION IN GERMANY

Immunizing material employed	Number treated	Number aborted after treatment	Per cent aborted	Per cent calved normally
Dead bacilli	937	117	12.5	87.5
Dead bacilli plus immune serum	157	20	12.7	87.3
Live bacilli	482	28	5.8	94.2
Live bacilli plus immune serum	57	3	5.3	94.7
Immune serum	17	9	53.0	47.0
Controls not immunized	1,356	245	18.1	51.9

The conclusions arrived at by the German investigators from the results of their observations were as follows: (1) The dead bacilli in both non-pregnant and pregnant cows produced some degree of immunity; it was, however, of low degree and of short duration. Many cows did not abort at the first calving after this method of treatment, but did at the second. (2) The dead bacilli when injected with immune serum gave results similar to those obtained from the use of the dead bacilli alone, and lead to the conclusion that both are of little use. (3) The live bacilli gave better results in all circumstances than the dead. Of 128 cows, which had previously aborted, treated with live bacilli, only six aborted afterwards. Better results were also obtained in preventing abortion in cows that

had never aborted yet were in herds with infected cattle. (4) The live bacilli plus the immune serum gave about the same protection as the live bacilli alone. This method also proved helpful in preventing abortion in pregnant cows, reducing the losses among them as did the live bacilli alone in non-pregnant cows. (5) The immune serum alone was found to be practically worthless. (6) The controls were injected with plain broth which gave no protection; in fact, there were more abortions in this group of cows after treatment than before.

It was observed that widely varying results occurred in different herds. For example, in some herds abortion disappeared completely; in others there was a decrease; in still others there seemed to be no change either way; while in a few herds there was an actual increase. As a result of all the methods of immunization taken together, there was a net decrease in abortion.

During the two-year period between January 1, 1919, and December 31, 1920, the Department of Veterinary Science of the University of Wisconsin prepared and distributed through veterinarians in Wisconsin nearly 1,000 doses of this vaccine. At the time this is written reports have been received on 474 vaccinated cattle and 101 controls in 42 different herds. These cattle were kept under ordinary farm conditions, so the criticism that the animals and their quarters were not typical can not be made. The vaccine used in this Wisconsin experiment was prepared very carefully to insure a uniform, uncontaminated and fresh product.

In order to find out how cattle of different ages and classes respond to the vaccine treatment, the animals were classified or divided into the various groups shown in Table 3. So far as was possible some animals in each herd were left unvaccinated as controls. It should be understood in studying these data that the disease was present in the majority of the herds here represented and had caused heavy losses in some of them, but it is not possible to give either the herd or the individual history. The average abortion rate in these herds previous to treatment was not determined. The controls had an average abortion rate of 31.2 per cent during the two-year period mentioned. A considerable number of the virgin

TABLE 3.—RESULTS OF VACCINATING CATTLE AGAINST ABORTION IN WISCONSIN
(The 42 herds here represented were under observation from January 1, 1919, to
December 31, 1920.)

Description of animals	Total number of animals	Less those barren, sold, died	Number aborted	Per cent aborted	Number calved normally	Per cent calved normally
Unbred heifers vaccinated.	136	136 - 9 = 127	28	22.1	95	77.9
Unbred heifers left unvaccinated as controls.	26	26 - 2 = 24	8	33.3	16	66.7
Open cows that have not aborted, vaccinated.	221	221 - 14 = 207	17	8.2	190	91.8
Open cows that have not aborted, left unvaccinated as controls.	21	21 - 3 = 18	10	55.6	8	44.4
Open cows that have aborted, vaccinated.	73	73 - 3 = 70	11	15.7	59	84.3
Open cows that have aborted, left unvaccinated as controls.	25	25 - 1 = 24	4	16.7	20	83.3
Closed cows that have not aborted, vaccinated.	13	13 - 2 = 11	3	27.3	8	72.7
Closed cows that have not aborted, left unvaccinated as controls.	26	26 - 4 = 22	5	22.7	17	77.3
Closed cows that have aborted, vaccinated.	31	31 - 7 = 24	3	12.0	21	84.0
Closed cows that have aborted, left unvaccinated as controls.	3	3 - 1 = 2	1	50.0	1	50.0
Entire number vaccinated.	474	474 - 35 = 439	62	14.1	397	85.9
Entire number of controls.	101	101 - 11 = 90	28	31.2	62	68.8

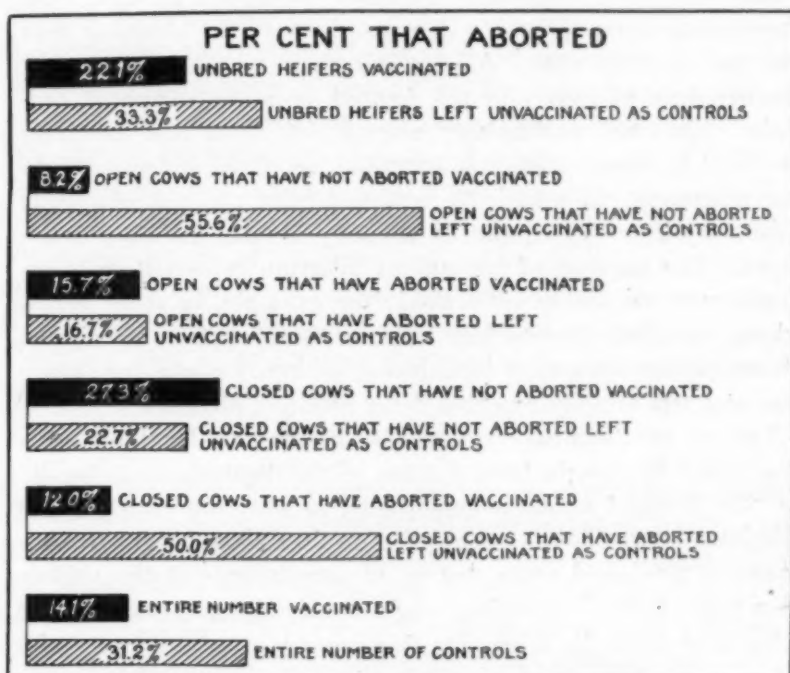
heifers had never been exposed to infection before being vaccinated.

Analysis of the figures given in Table 3 shows that out of 127 unbred heifers that were vaccinated previous to conception 77.9 per cent calved normally, while only 66.7 per cent of the controls did. In other words, the abortion rate in the controls was 33.3 per cent, which is very high and shows that the infection which existed in the herds was virulent. These results from the use of the vaccine in heifers were not so satisfactory as we had anticipated for this age group before tabulating our data, but they do demonstrate that the vaccine has immunizing value for heifers. The figures support the well-known belief that heifers are more susceptible to the abortion disease than are mature cows. They do not coincide with the opinion of the German workers that age has no bearing either on susceptibility to the disease or to immunization, provided that the animals are sexually mature.

The most gratifying results were obtained with open cows that had never aborted. In this group the vaccine was 91.8 per cent effective, which is in marked contrast to 44.4 per

cent of normal calvings for the controls. This indicates that the vaccine has its greatest value for open cows in herds where the epizootic is known to exist.

The vaccine had little value when administered to open cows that had aborted. In this group the percentage of cows that calved normally was nearly the same as in the case of controls. This is just what one would expect when the fact is taken into consideration that some immunity is conferred as a result of a naturally acquired infection.



Comparison of Abortion in Vaccinated and Unvaccinated Cattle in Wisconsin Experiments. (See Table 3 for Details.)

As would be surmised, a higher percentage of the cows that were pregnant at the time of vaccination and that had never aborted did abort subsequently than did the controls that were not vaccinated. The difference, however, was not marked.

Of the cows that had aborted and that were pregnant at time of treatment, the figures show that the percentage of normal calvings was nearly the same as in aborters that were vaccinated before being bred. The number of controls in this group is so small that no conclusions can be drawn from them.

Altogether 474 cows and heifers were vaccinated. Of these 439 were available for data, the others having failed to breed, been sold or died. Only 14.1 per cent of these aborted, while of the 101 controls that were not treated 31.2 per cent aborted. When these figures are compared it is seen that the abortion rate was twice as great in the controls as in the vaccinated animals.

The writer believes that these Wisconsin experiments warrant the conclusion that the abortion vaccine has a decided immunizing value, especially for cattle of certain groups. The vaccinated cattle showed a decrease in both the abortion rate and the sterility rate. As a result there was an increase in the breeding efficiency of the treated over the untreated animals. This was particularly marked in the second gestation period. In some herds no abortions occurred subsequent to the treatment; in others the abortion rate was not changed; in a very few the treatment actually seemed to be a detriment. The sequelæ of contagious abortion infection in many herds were favorably influenced; for example, in some herds, where repeated services had been necessary before conception occurred, the cows after inoculation promptly conceived; there was also less trouble reported from retained placenta.

Let us now compare the results secured in England, Germany and Wisconsin from the use of the dead abortion bacilli, or that product known commercially as abortion bacterin. In England it was found to be of no value whatsoever; in Germany it produced some degree of immunity, but the protection was of short duration, and not substantial enough to be depended upon; in Wisconsin this product was used in a series of experiments, not reported in this paper, in which it was found to have absolutely no immunizing value. These data warrant the conclusion that under both farm and experimental conditions abortion bacterin has failed.

By comparing the results from the use of the live abortion bacilli as shown in Tables 1, 2 and 3 it is seen that this product was 93.5 per cent effective in preventing abortion in England, 94.2 per cent effective in Germany and 85.9 per cent in Wisconsin. This is an average of 91.2 per cent, which is very gratifying. In England 23.4 per cent of the control animals aborted, 18.1 per cent in Germany and 31.2 per cent

in Wisconsin, which makes a general average of 24.2 per cent. The difference in results may be accounted for by the difference in virulence of the infection, which apparently was most pronounced in Wisconsin, considerably less pronounced in England, and markedly less in Germany, as fewer untreated controls aborted in the latter two countries and a smaller percentage of abortions occurred among the vaccinated animals in these foreign countries than Wisconsin. The possibility also exists that the Wisconsin cattle were more susceptible to infection.

In closing, the writer wishes to warn against the dangers of passing premature judgment on the value of any therapeutic agent for contagious abortion. One should guard himself against excessive optimism based on the results of limited trials, for this might be a means of confusing the issue. Therefore the results reported in this paper should be taken with the same degree of conservatism in which they are given. In view, however, that success was achieved in such a large number of animals on which the statistical records are complete, the idea of attributing the results to spontaneous cure may be dismissed.

A shipment of 3,000 reindeer carcasses, to be sent to all parts of the United States, including the Atlantic seaboard, was due to arrive in Seattle from Nome September 1. Five thousand reindeer are available for meat, but transportation facilities will permit only 3,000 to be shipped. The surplus young male reindeer are now being culled out preparatory to slaughtering and shipping. All fresh meat will be stored in the refrigerators of the Seattle Port Commission until redistributed.

One of the startling conclusions to be drawn from poultry culling work in Iowa the present season is the widespread prevalence of disease found in farm flocks by the investigators. Some reports show that as high as 75 per cent of the flocks in some counties are found to be tuberculous. The general results found are indicative of the fact that disease is much more prevalent than it was last year.—*Iowa Homestead*.

THE RELATION OF THE CORPUS LUTEUM TO ESTRUM AND INVOLUTION OF THE PATHOLOGIC UTERUS ¹

By W. L. BOYD

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* IN discussing the corpus luteum the writer thought it advisable to give a brief discussion of the histology and physiology of this endocrine gland.

The corpus luteum or yellow body is a gland of internal secretion and originates or develops from the mature Graafian follicle following its rupture. Immediately beneath the modified mesothelial covering of the ovary is the germinal epithelium. The germinal epithelium proliferates actively, as do also the primordial ova, and is said to dip or extend down into the stroma, carrying with it the ova. These groups of cells are called Pfluger's tubes. The connective tissue surrounding these columns of epithelial cells develops in such a manner that masses of germinal epithelium containing one or more primordial ova are split off, until finally the ovary is formed entirely of primary follicles and connective tissue stroma.

The Graafian follicles, which were first described by Rene de Graaf and named after him, are found in three different stages: primary, growing and maturing follicles. As the follicle or ovisac approaches maturity, it is then located near the surface, where it finally projects to the exterior in the form of a vesicle. When the follicle is fully matured the fibers of the theca separate, necrosis results, and the follicle ruptures at this point, which is known as the stigma. The rupture of the ripe ovisac with the discharge of the ripe ovum constitutes the act of ovulation.

The wound, if one may be permitted to call it such, which results from ovulation, rapidly fills with blood, forming what is known as the corpus hemorrhagicum. This body is soon replaced by large epithelial cells, which, according to Novak,

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originate from the stratum granulosum. These cells contain a yellowish brown pigment first called lutein, but now according to Escher is known to be carotin, a substance identical with the pigment of carrots. This pigment is very pronounced in the cow. The corpus luteum of the mare, ewe and sow is not so highly colored, and according to Palmer carotin is not present in the lutein cells of the sow.

The corpus luteum of pregnancy develops to about the size of a marble or an acorn and occupies almost the entire part of the ovary, being surrounded by a network of capillaries. The arrangement of the cells approximates the placement of the cells in the cortical region of the suprarenal gland. The false corpus luteum does not grow to any great size and as a rule practically disappears within twenty to thirty days. The histological appearance of both true and false corpora lutea is probably identical.

THE FUNCTION OF THE CORPUS LUTEUM

To Gustav Born of Breslau belongs the credit of being first to suggest that the corpus luteum is a ductless gland producing a secretion which prepares the endometrium for the attachment of the fertilized ovum. Frankel's researches on this subject have been extensive and his general conclusions are as follows:

The corpus luteum is a ductless gland which is renewed every four weeks during reproductive life in the human female and at different intervals in the various mammals. . . . Its function is to control the function of the uterus from puberty to the menopause, to prevent it from lapsing into the infantile condition or undergoing atrophy, and to prepare its mucous membrane for the maintenance of the ovum. If the ovum be fertilized the corpus luteum is responsible for maintaining the raised nutrition of the uterus during gestation. If the ovum be unfertilized it merely produces the hyperemia of menstruation and then undergoes degeneration until it is renewed in a fresh position.

Most observers are agreed (with a few exceptions) that estrum and menstruation do not occur after the ovaries have been extirpated, and that the phenomenon of menstruation is brought about by an internal secretion from the ovary. As stated above, Frankel believes this secretion is supplied by the corpus luteum. But Marshall contradicts this by his statement that in most mammals ovulation does not occur until estrum. He mentions that in the rabbit ovulation may not take place until stimulated

by coition, and in the dog ovulation occurs after external bleeding has been in progress for several days. Marshall is of the opinion that in our domestic animals the act of menstruation precedes estrum. In relation to the bovine, our observations are different from those recorded by Marshall. We have noticed that cows frequently menstruate, not markedly but noticeably so, two to three days following estrum. We also believe that in most cases where cows are bred and fertilization takes place, menstruation does not occur. If the ovum remains unfertilized, or if the fertilized ovum is aborted, menstruation usually follows. We have, however, known of individual animals to have menstruated after service, yet having been successfully fertilized. Most herdsmen are now cognizant of the fact that cows or heifers, particularly heifers, which menstruate following service will again be in estrum at the termination of the next dioestral period.

Marshall and Jolly state that corpora lutea are not present during the proestrum, and are therefore functional only subsequent to ovulation. We believe that generally speaking this statement is true, but when applied to the bovine it should be modified. We have upon numerous occasions found cows to be in estrum in which a corpus luteum was present.

In relation to the function of the corpus luteum and the causation of estrum, Marshall and Jolly conclude as follows:

The ovary is an organ providing an internal secretion which is elaborated by the follicular epithelial cells or by the interstitial cells of the stroma. This secretion circulating in the blood induces menstruation and heat. After ovulation, which occurs during estrus, the corpus luteum is formed, and this organ provides a further secretion whose function is essential for the changes taking place during the attachment and development of the embryo in the first stages of pregnancy.

It is our belief that the corpus luteum bears a much closer relationship to estrum than the researches of Marshall and Jolly would indicate. Particularly is this true in the cow. The corpus luteum in the cow probably does not undergo as rapid degenerative changes as it does in other domesticated animals. This may be the explanation of the fact that mares come in heat following parturition much earlier than do cows. In cases (with few exceptions) where the corpus luteum fails to degenerate or become absorbed it interferes with estrum. This kind of a structure has been termed a persistent corpus luteum. In

non-pregnant cows in which there is an absence of estrum, and in which there is a corpus luteum present without other extensive pathologic conditions, the removal of same is with marked and astonishing regularity followed by estrum within three to five days. The corpus luteum undoubtedly interferes with ovulation mechanically and by the elaboration of an internal secretion which exerts an inhibitory action on the maturation of the Graafian follicles.

We have examined a large number of cows in our clinic for the purpose of determining the reason or reasons for the absence of estrum. Many of these animals, in so far as we were able to judge from a physical examination, had (with the exception of a persistent corpus luteum) normal reproductive organs.

The corpus luteum was removed, or, if difficult of removal, was massaged for the purpose of making its enucleation more easy at the next examination, which has usually been at intervals of ten days to two weeks. Invariably estrum would follow within three to five days after operating. There were, however, exceptions to this rule, as some cows came in heat as early as two days after being operated on, while others required as long as ten days. In some cows estrum undoubtedly did take place, but went unnoticed, and for this reason it was thought that the removal of the corpus luteum did not produce the well-known signs of heat. Examinations for such cases will as a rule reveal the presence of a newly formed corpus luteum. We have operated on cows where there was a persistent corpus luteum in the left ovary. Estrum took place within a few days when they were bred and then watched carefully for the presence of the next estrum. If heat did not occur they would be returned to the clinic again within forty to sixty days, the length of time being determined by the age of the animal. At this time an examination for pregnancy was made, and in those which proved to be pregnant we would frequently find a right horn pregnancy, with the corpus luteum of course located in the right ovary. In cases where the persistent yellow body was removed from the right ovary, the above described changes were frequently reversed. This sort of evidence supports the theory that the corpus luteum does interfere mechanically with ovulation in the ovary in which it is located, and probably by some internal se-

cretion which inhibits ovulation in the opposite ovary. Where the corpus luteum has undergone a certain amount of atrophy and has become deeply situated within the ovary it is often necessary to practice ovarian massage for a number of weeks before it can be safely dislodged. In one or two cows we have had to resort to ovariectomy, and in each instance estrum appeared as soon as healing was complete.

The removal of the corpus luteum in the early stages of gestation is followed by the expulsion of the embryo or fetus within a few days. If a small portion of the lutein tissue remains, regeneration may take place to such an extent that it may prevent abortion. Heifers that have been bred too young, or in cases where purebred heifers are in calf to scrub sires, the removal of the corpus luteum will usually produce the desired results. This operation can probably best be performed as early as one can be certain the animal in question is pregnant.

The following case report serves as an illustration of the relation of the corpus luteum and estrum:

The patient, a purebred Aberdeen Angus cow, age four or five years, was reported to have failed to show symptoms of heat since her last calving. She calved successfully four or five months prior to the date on which we were consulted. An examination revealed the presence of a corpus luteum. All other reproductive organs were believed to be normal. We removed the corpus luteum and advised breeding as soon as estrum appeared. Estrum was noticed and cow was served within a few days following the operation. She again appeared in heat at the termination of the dioestral period and was rebred. No further signs of heat developed and it was thought she was in calf. Near the termination of gestation she was examined for pregnancy, but was found to be open or not in calf. There was a corpus luteum present and mild cervicitis was at this time detected. Since that time this animal has been under our close supervision, and up to the present time, in so far as we have been able to determine, has never appeared in estrum, except when we have removed a corpus luteum, which has been performed a number of times. We have allowed her to pass over three, four or five periods of heat, thinking possibly she might have conceived, but in each instance the examination for pregnancy showed that conception had not resulted. It is not of

course entirely improbable that she may have aborted an embryo or two, but a close watch has failed to reveal any evidence of an abortion. The cervicitis responded to treatment, which has apparently had little or no effect on the act of estrum.

During our studies of sterility we have not met with a closely similar case. Our experience shows quite conclusively that cows affected with sterility due to the presence of a persistent corpus luteum respond rapidly and regularly to treatment. In many cases conception takes place on the first service. There are, however, exceptions to this rule.

RELATION OF CORPUS LUTEUM TO PYOMETRITIS

Pyometra is a condition of the uterus in which there are chronic inflammatory changes of the uterine mucosæ characterized by sacculation of one or both of the horns and flaccid muscular walls with little or no contractile power due to a loss of muscle tone. The uterus is asymmetrical, abdominal in position, and one or both horns are partially filled or distended with pus. The cervix is inflamed and more or less dilated. This pathologic condition most often occurs in cows which have suffered with retention of the fetal membranes, but is known to occur in cases where the membranes were promptly discharged after calving. One of my colleagues working with the bacterial flora of this condition has in the large majority of cases been able to isolate *Bacillus pyogenes*, which is apparently the predominating organism in these types of infection.

The history of pyometra is as follows: The owner or herdsman in describing these cases states that the affected animal has not been in estrum since calving and that a small pool of pus is as a rule found back of her after she has assumed a recumbent position. They also notice that there is more or less straining of the lips of the vulva together with collection of pus on the under surface of the tail. In innumerable instances cows suffering with pyometra are allowed to go for a period of six or seven months before the services of a veterinarian are employed. In the treatment of pyometra, unless begun early, the prognosis should always be guarded, the reason for this being that even though the uterus undergoes complete involution and estrum is regularly established, the regeneration of the mucous membrane is so slow that attachment of the fertilized ovum is made diffi-

cult. Or in cases where the ovum does become imbedded, early abortions are not infrequent.

The veterinarian who is experienced in the treatment of sterility fully appreciates the value of the dislodgement of the corpus luteum in the successful treatment of pyometra. In cows where the disease has been present only a short time the corpus luteum will frequently be found near the surface of the ovary, but in the long-standing cases the yellow body will be found to be more centrally located and therefore more difficult of ablation. The dislodgment of the corpus luteum in its entirety is responsible for such rapid changes in the uterus that one wonders at so much power being invested in so small a structure. Not only does the uterus promptly discharge its contents through the reestablishment of muscle tone, but it also changes rapidly, morphologically, regaining its symmetry and normal anatomical position within a very short time. Estrum frequently, though not regularly, appears within three to five days, especially in cases where tissue destruction has not been extensive. In the treatment of pyometra it is deemed best to siphon off the contents of the uterus before attempting to remove the yellow body. In this way the ovaries can be more readily and safely examined. The uterus can be retracted so that the ovary or ovaries can be without difficulty brought into the pelvic cavity, when the corpus luteum can be manipulated through the vagina. If the yellow body is deeply situated it should be removed per vagina, and no doubt this procedure should be followed regularly. We have, however, removed a large number of corpora lutea by pressure exerted through the rectal walls without bad results. In carrying out some experiments with pyometra we decided to remove the corpus luteum without attempting to siphon off the contents of the uterus, which, if performed, undoubtedly facilitates involution.

The following cases are reported:

No. 1.—The patient, a purebred Jersey heifer, calved normally on February 10, 1921. The calf was normal and the fetal membranes were promptly discharged. The vaginal discharge gradually lessened, lactation was thought to be normal, and the appetite was unimpaired. A few weeks after calving the herdsman noticed that usually in the mornings there would be a small pool of thick cream-like pus in the gutter behind the heifer.

It was noticed also that there were accumulations of pus on the edges of the vulva and on the under surface of the tail. Estrum was absent.

On April 22, 1921, we examined this animal and found her to be affected with pyometra. The right horn of the uterus was elongated, enlarged, and filled with pus. The left horn was apparently only slightly affected. A corpus luteum, which was located near the surface, was found in the right ovary. The external cervix was only partially dilated and did not permit of the escape of pus when the uterus was massaged. The removal of the corpus luteum was somewhat difficult, which was due to the fact that the ovum was carried so far forward into the abdominal cavity. The distended horn interfered with the operation only slightly. The yellow body was removed and torsion applied to the ovary until it was thought that the hemorrhage had been controlled. The heifer continued eating and evidenced no signs of discomfort. The herdsman was advised that there would be a considerably larger amount of pus in the gutter by morning. She was operated on about 8:30 p. m. The next morning two or three liters of a grayish-white cream-like pus was found. The discharge continued for two or three days and ceased. Estrum took place four days after the operation. On April 30 she was again examined and found normal, the uterus having undergone complete involution. We advised breeding on the third or fourth estral period. Prognosis in this case is favorable.

No. 2.—The animal, a purebred Holstein-Friesian cow, five years of age, calved last on November 28, 1920. A normal healthy calf, but fetal membranes were retained. On March 26, 1921, she was examined and found to be suffering with pyometra. Cervicitis was found to be fairly extensive. Both horns of the uterus were enlarged, elongated, flaccid, and filled with pus. A large prominent corpus luteum was found in the right ovary. On March 28 we removed the corpus luteum by way of the rectum, and on the next day large quantities of pus were flowing freely. This material gave off an offensive odor. Cultures were made from the pus, which was obtained from swabs that had been introduced into the internal cervix and body of the uterus. *Bacillus pyogenes* was isolated without difficulty. April 2 estrum appeared, and in the uterus, with the exception of incomplete return of muscle tone to the right

horn, involution was almost complete. The cervix was treated regularly with Lugol's solution undiluted. This cow rapidly grew better and was dismissed from the clinic April 15, 1921. Since going home she has been bred twice, and it is questionable if she is now in calf. No doubt extensive tissue changes were present in this case, and regeneration of the uterine glands and surface epithelium will be slow. I would not be surprised to hear later that this cow has aborted a two or three months old fetus. I would not advise early breeding in this type of cases, and the prognosis should be guarded.

The manner in which the uteri of the above reported cases with such rapidity regained their normal structure and position is quite remarkable.

No. 3.—A purebred Holstein-Friesian cow, aged 6 years, weight 1,400 pounds, in good physical condition, having calved last in October, 1920. She gave birth to a healthy calf, but retained the fetal membranes, which were manually removed. We examined this cow on April 16, 1921, and found her to be affected with pyometra. No signs of estrum had been noticed up to this time. The symptoms observed here were typical of pyometra, and upon physical examination pathologic conditions or changes similar to the ones described in the second case were found. In this case the corpus luteum was located in the left ovary. Cervicitis was extensive with hypertrophy of the external os. We operated on April 17, and on the 18th the uterus was found to be practically empty, the left horn was greatly reduced in size, being almost as firm as the right horn, and when stimulated by massage contraction was very noticeable. The os uteri, which was dilated in the beginning, was contracting slowly. The appetite remained good except that she refused grain feed following the operation. The milk flow increased markedly and signs of estrum appeared within a few days. Cultures taken from the pus from the vagina and cervix showed growths of *Straphylococcus albus*, scattered colonies of hemolytic streptococci and *Streptococcus viridans*. These types of organisms predominated. Colonies of *Bacillus pyogenes* were present, but not in large numbers. On April 25 this cow was practically normal. Clear mucus was discharged from the vagina, and the cervix was reduced in size and not so highly colored. April 30 we again swabbed the cervix with Lugol's iodine solution, and as the patient was apparently normal she

was dismissed from the clinic. Prognosis in this case is guarded. We are of the opinion that she will again get safely with calf, although she may suffer an abortion before so doing.

No. 4.—A purebred Guernsey cow, 5 years, weight 1,050 to 1,100 pounds; good physical condition; last calving date June, 1920. She gave birth to full-time but dead calf. Fetal membranes were retained. This cow was presented in our clinic January 13, 1921. Here was a case of approximately six months' duration. On physical examination we found the os uteri partially dilated, permitting the escape of only small particles of pus when massage was applied to the uterus. The uterine horns were both greatly enlarged, flaccid, abdominal in position, and filled with an offensive smelling, creamy pus. Small amounts of this material were discharged when the cow was recumbent. A corpus luteum was removed from the right ovary on January 17, 1921, without producing any noticeable physical pain. The appetite was impaired for a day or two and somewhat capricious for perhaps a week, but she rapidly rounded to, and the milk flow was increased. On January 24 the uterus had undergone almost complete involution. It was then pelvic in position, but the right horn was still larger and longer than the left one. The cervix was treated at regular intervals, and while recovery seemed fairly rapid in this case, prominent signs of estrum did not appear until March 7, 1921. A few days later we again examined this cow and, thinking that she had fully recovered, we shipped her home. Since leaving our clinic she has been in heat regularly and has been bred two or three times, but has failed to conceive. We examined her a few days previous to this writing and found that a large abscess had formed in the right ovary. The oviduct on the same side is probably also involved. The infection has no doubt extended along the mucous membrane of the tube, entering into the wound produced by the enucleation of the yellow body, or gaining access to the ovary at the time of rupture of a ripe ovisac. We advised ovariectomy, as the cow is a valuable one. Prognosis is unfavorable.

THE CORPUS LUTEUM AND MUMMIFICATION OF THE FETUS

Mummification or desiccation of the fetus is not at all uncommon in bovine practice, but is not of course as common as pyometra. Just what relationship bacteria bear to this phenomenon has probably not been definitely determined. Bang reports

having isolated *Bacterium abortus* from mummified fetuses. It would seem to the writer that possibly *Bact. abortus* Bang is the causative factor in a certain percentage of these cases. A careful bacteriological study of desiccated fetus would be of great interest and value. W. L. Williams, in his recent publication, "Diseases of the Genital Organs of Animals," states that inter-placental hemorrhage with fetal desiccation is an interesting and an important clinical manifestation of placental disease. It has not been shown to be dependent upon disease of the nonplacental uterine areas. As a result of the hemorrhage the placental membranes are forced apart, and the fetus, which succumbs, becomes surrounded by a hematoma which soon undergoes secondary changes until it becomes a soft, plastic, chocolate colored material surrounding the fetal envelopes and fetus, which in turn becomes mummified.

The diagnosis of mummification of the fetus is not difficult. The history of the case is invaluable and the operator should give this due consideration in connection with the physical examination. The uterine seal is well formed and the corpus luteum may be deeply imbedded, or, in cases of not too long standing, it will project to the exterior. The removal of the corpus luteum will in the large majority of cases cause an expulsion of the uterine contents within three to ten days. In other cases where the yellow body has suffered with degenerative changes and the contractile powers of the uterus is at low ebb, the seal should be broken down and if necessary douching should be performed. In certain of these cases we have been able to remove successfully the corpus luteum through the vagina, while in others it has been necessary to operate per rectum. We have never in these cases had to resort to ovariectomy in order to dislodge the corpus luteum, but no doubt this operation may have to be performed, especially in cases where the corpus luteum is small, centrally located, and difficult of manipulation. In the past two years we have operated on six of these cases, one of which, a purebred Guernsey cow, has been returned a good breeder, having had one healthy calf since the operation. In another which we treated a long time for pyometra, conception occurred early after treatment, but the fetus became mummified, and on account of her having been unable to produce a healthy calf over so long a period of time she was sent to

slaughter. The other cases, with the exception of those which were sent to slaughter, have not been followed up, so that I do not know of their ultimate outcome.

The expulsion of the corpus luteum works wonders in these cases, and one should not depend upon other means of delivery. The corpus luteum bears a close relationship to both estrum and involution of the pathologic uterus, and the veterinarian who is doing cattle practice, if not already familiar with the workings of this gland of internal secretion, should immediately familiarize himself with it, for not only will he increase his activities as a cattle practitioner, but his clientele will be more appreciative of his ability, and his services in other fields of practice will be more eagerly sought for.

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The Farmer says: There is no reason why livestock producers should not cooperate with the packers or any other marketing agencies in a campaign to increase the use of meat products. The fruit men of the West and the dairymen have pointed out the way to boost consumption, and they are profiting by the increased demand. Why not apply the same idea to the livestock business?

National Stockman and Farmer says: Where are the trotters necessary to entertain the crowds at county fairs to come from five or ten years hence? Not enough are being bred to keep up the horse population. Better breed that well-bred mare.

SOME OBSERVATIONS RELATING TO SEX DETERMINATION AND THE EMBRYOLOGY OF THE UTERUS¹

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NOT MANY YEARS have elapsed since biologists quite generally entertained the opinion that sex determination did not occur at the time of the fertilization of the ovum. It was held that Nature did not decide this important matter until the embryonic stage was fairly well advanced. This belief was strengthened by the fact that the Wolffian ducts and the Mullerian ducts—forerunners of essential portions of both the male and the female generative organs—are present in all normal embryos, and it was supposed that, after a decision had been arrived at, one set of sex organs progressed to full completion, while the embryonic structures representing the generative organs of the opposite sex underwent no further development and became atrophic.

In the male the Wolffian ducts go to form the excretory channels of the testicles, and vestiges of the Mullerian ducts are represented by the uterus masculinus. In the female the Mullerian ducts develop into the Fallopian tubes, the uterus and the vagina, and vestiges of the Wolffian ducts are represented by the parovarium and the canals of Gaertner, found in either side of the walls of the vagina.

The fact that hermaphroditism occasionally occurs apparently corroborates the hypothesis of delayed sex determination and might lead to the supposition that the condition is referable to indecision on the part of Nature, resulting in the partial or imperfect development of both male and female generative organs.

Although it must be admitted that embryos do possess elementary structures from which organs of either sex may develop, this is not proof that sex was not determined at the time of the fertilization of the ovum. Neither does hermaphroditism prove delayed sex determination, for the reason that certain influences might be brought to bear upon the growing fetus which could

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interfere with or modify the normal development of sexual organs in spite of definite sex determination at the time of conception.

In the light of more recent investigations it would seem that sex determination takes place simultaneously with the fertilization of the ovum.

The scope of this paper will not permit of reviewing the phenomenon of mitosis in ordinary tissue cells, the important details of which are more or less familiar to all. Suffice it to say that the present-day theory of sex determination is based in part upon this phenomenon.

A certain definite number of chromosomes have been demonstrated in the nuclei of the body cells of different species of animals. For instance, man has 48, the hog has 40, *Ascaris megalocephala* has 4, and one of the grasshoppers has 14. These numbers apply to the chromosomes of tissue cells, but not to those of the ova and the spermatozoa, the so-called functional reproductive cells. The reproductive cells undergo a process of maturation so that finally they contain only half the definite number of chromosomes required by the tissue cells of the species. The reason for this reduction is that while a tissue cell containing, say, 40 chromosomes divides so that each chromosome is split into two, each resulting in a daughter cell containing the original number of 40, it should be remembered that the chromosomes derived from the nuclei of both the ovum and the sperm cell are present and take part in the phenomenon of fertilization. Therefore only half the number of chromosomes is needed from each source to make up the total required by the body cells of the species.

It will be noted that cell division in growing tissue cells is a much simpler process than the phenomenon of the fertilization of an ovum by a sperm cell. The latter implies either fusion of the individual chromosomes or their arrangement in such a manner that when cell division takes place half of the chromosomes furnished by the ovum and half of those derived from the sperm cell will be present in each of the two daughter cells, marking the beginning of a new being embodying the hereditary properties of both parents.

Investigators have shown that in a certain variety of grasshoppers the cells taken from different tissues of males contain 6 pairs of chromosomes of similar appearance and one chromo-

some differing from the others, making a total of 13. The tissue cells of females show 7 pairs of chromosomes, 6 pairs of which are apparently like the 6 pairs found in the male, and one pair resembling the odd or thirteenth chromosome of the male, making a total of 14. The female reproductive cells before their division into the functional reproductive cells (ova) contain the same number of chromosomes as the tissue cells just mentioned. However, after the final division the mature ovum contains only 7 chromosomes, 6 of which are alike, and one odd one, which represents, of course, one-half of the 6 pairs of similar chromosomes and the one pair of odd chromosomes found in the reproductive cell before its division to form the functional reproductive cell. As already stated, the tissue cells of the male contain 13 chromosomes, which number applies to the reproductive cells before the final division into the functional reproductive cells, the spermatozoa. It is evident that there must be two kinds of sperm cells occurring in equal numbers: one kind containing 7 chromosomes, the other containing 6, as a result of the division of a reproductive cell containing 6 pairs of chromosomes and one odd chromosome, or 13 in all. If an ovum which invariably contains seven chromosomes is fertilized by a spermatozoon containing 6 chromosomes, an individual will develop containing 13 chromosomes in its body cells, therefore a male. On the other hand, if an ovum is fertilized by a spermatozoon containing 7 chromosomes, an individual containing 14 chromosomes in its body cells, or a female, is the result. The odd chromosome in the ovum and the odd chromosome in the female determining spermatozoon are referred to by biologists as the accessory, or X, chromosome. In the human, according to Van Winewarter, the male-determining sperm cell contains 23 chromosomes, while the one determining female sex contains 24.

The matter of "identical twins" is interesting on account of the probable relationship to sex determination. In ordinary twins two ova are fertilized. These ova result from the rupture of two Graafian follicles in the same ovary, or from two Graafian follicles one of which is situated in each ovary. Three possibilities are presented. First, each of the two ova may be fertilized by a male-determining sperm cell, resulting in twin males. Second, each of the two ova may be fertilized by a female-determining sperm cell, resulting in twin females.

Third, one of the ova may be fertilized by a male-determining sperm cell, and the other ovum may be fertilized by a female-determining sperm cell, resulting in twins, one a male, the other a female. On the other hand, "identical twins" are the result of a complete division of one ovum or blastoderm, resulting in the formation of two distinct embryos. As sex was determined when the ovum was fertilized, prior to its division, the twins are of the same sex. Each has its own amnion, but they are inclosed in one chorion. The common chorion is considered proof of this form of pregnancy.

A prominent writer on the subject of genetics recently made the following observations:

Breeders of dairy cattle in particular often become discouraged with a bull which seems to sire largely bull calves. It must be remembered in this connection, however, that rather large departures from equality may occur simply by chance. Thus if a coin is tossed 20 times, the best expectation is 10 heads and 10 tails, but about once in 40 times a departure as great, or greater, than 15 heads or tails is to be looked for. Thus a large number of dairy cattle breeders may be expected to get 15 or more bull calves out of 20 calves born. Such a result in one year would not have the slightest effect on the sex ratio the next.

Another well-known authority states that "sex seems to be determined by one of the chromosomes, and is probably settled at the time of conception. The determination of sex is therefore a matter of chance over which the breeder has no control. For practical purposes, the breeder will find that, over a period of years, he gets nearly equal numbers of both sexes."

Reference has been made to elementary structures known as the Mullerian ducts, found in all normal embryos. In animals having rather prolonged periods of gestation, such as the mare and the cow, they appear early in the second month of pregnancy as two rods of mesoblastic tissue arising in the right and left sublumbar regions, converging caudally in the form of a V near the posterior common body opening or cloaca. The rods become hollowed out to form tubes, and near the end of the second month the extremities of the ducts, which already are in contact with each other, become fused. The coalescing of the two tubes—right and left—results caudally in the formation of a single medial tube, the length of which depends upon the extent of the fusion; and the structures which at first resembled a V in form now resemble the capital letter Y. The opening of each duct into the peritoneal cavity in the sublumbar region repre-

sents the future ostium abdominale of the Fallopian tube. The fused medial tube represents the future vagina and, in those species in which the fusion progresses beyond this point, the body of the uterus.

The following observations relative to the uteri of various species are taken from Williams's "Veterinary Obstetrics":

Derived from the ducts of Muller, it (the uterus) varies greatly in form and disposition, partly dependent upon the degree of fusion between these two structures. There are generally recognized a uterine body and two cornua, each having essentially like functions in varying degrees.

In the rabbit there exists no uterine body, but two distinct tubular uteri, opening separately into the vagina. In the bitch, cat and sow the uterine body is limited in extent and physiologically unimportant, rarely containing even a portion of a fetus except in transit at the time of birth, while the two cornua are extensive, and in them develop virtually all fetuses so that, physiologically, they represent the two separate uteri of the rabbit.

In ruminants the uterine body becomes markedly greater in size, and assumes far higher importance physiologically, while the cornua remain relatively large. In these animals the one, two, or more fetuses habitually rest almost equally in the body and cornua, so that they represent a middle point in the transition between the double uterus of the rabbit and the single uterus of woman, physiologically devoid of cornua. In the mare the uterine body becomes relatively more important than in the ruminant.

The relative importance of the cornua to the uterine body sustains a close relation to the number of young brought forth at a given birth. In multiparous animals there are two uteri, as in the rabbit, or the two extensive cornua with functionally unimportant uterine body, as in the bitch, cat and sow. In ruminants, which are largely biparous, the uterine body and cornua become approximately equal in extent and function.

In the normally uniparous mare the cornua are smaller than the body, while in woman the uterus is virtually without cornua in size or function.

In the larger animals, like the cow, size of the parts readily permits of extensive rectal palpation and manipulation of the uterus, tubes and ovaries, thereby making it possible to carry out the excellent work that is being done at the present time in the early diagnosis of pregnancy and the treatment of sterility.

Washington Post publishes a cablegram from Paris to the effect that "Bully beef, from Chicago, known to the poilus as 'tinned monkey,' may be the poor man's menu this winter. The Department of Agriculture is suggesting a series of propaganda campaigns to develop an appreciation for tinned meats."

SOME SURGICAL OPERATIONS ON THE OX¹

By H. E. BEMIS

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IN presenting this paper it is my intention to outline treatment for some of the common surgical conditions affecting the ox, excluding from the discussion the surgery of the reproductive organs, which has been so well presented before your association at recent meetings. The conditions presented in this paper are those which need special consideration on account of the differences in the anatomy of the region affected from the anatomy of the same regions in the horse, with which we are probably more familiar. We all realize that the present trend of affairs is constantly leading the veterinarian toward greater practice on conditions affecting the food-producing animals, and it is extremely important that the special problems affecting each species be emphasized.

DRAINAGE OF THE FRONTAL SINUS

The frontal sinus of the ox is very different from that of the horse, particularly with respect to its extent superiorly and the fact that it is partially divided by many bony septa, which makes direct drainage through the cavity impossible. Aside from the usual description of the frontal sinus as given in Sisson's Anatomy, I wish to call attention to the following facts:

1. The frontal sinus in many specimens extends posterior to the region of the poll or frontal eminence and laterally to a point just anterior to the external ear.
2. The deepest and freest portion of the frontal sinus is found about midway between the base of the horn core and the median line. The cranial plate arches upward in the center of the skull inferior to this free portion so that the cavity is limited to the lateral borders on a line drawn across the narrowest portion of the head, about midway between the posterior border of the orbital cavity and the base of the horn.

¹Presented at the twenty-third semi-annual meeting of the Minnesota State Veterinary Medical Association, Hutchinson, Minn., July 14 and 15, 1921.

In the plane which passes through the posterior borders of the orbital cavity the sinus again swings toward the median plane and at this point constitutes the second largest cavity and marks the lower limit of the frontal portion of the sinus. Upon a plane passed through the middle of the orbital cavities, the frontal portion of the sinus is usually separated from the turbinal portion of the sinus by a complete septum.

The same idea may be expressed in a different and perhaps clearer way by stating that if a horseshoe having wide webbed branches and a narrow toe should be placed upon the ox's head so that the upper branch would rest upon the median line in the region of the poll and the toe of the shoe would rest upon the lateral portion of the frontal region at its narrowest point, the lower branch would rest over the second most free portion of the sinus and any point covered by the shoe would be a safe point for trephining the sinus.

3. On a plane passing through the narrowest portion of the region a small opening about the size of a lead pencil passes from the floor of the sinus into a compartment which is separated from the temporal fossa only by a thin plate of bone. In case pus is retained in this compartment, the bone sometimes becomes necrotic and an abscess develops, posterior to the eye and occupying the temporal fossa.

4. From the lower limit of the frontal portion of the sinus on a plane passing through the center of the orbits and about one and one-half inches from the median line, the frontal sinus communicates with the nasal cavity through the ethmoid cells. From a trephine opening located as just described, drainage may be established through the nose by passing a curved instrument from above to below and directed slightly toward the median line.

The frontal sinus of the ox usually becomes infected following accident to the horn or dehorning operations. In these cases one usually has a means of entrance to the superior free portion of the sinus. The other two points where it is most practicable to trephine the sinus for further drainage are over the toe and the lower branch of the horseshoe-shaped area already described. From the first of these the compartments in the temporal fossa may be flushed, and from the second one bottom drainage may be established through the nasal cavity. If

an abscess forms in the temporal fossa it may be drained by an incision through the skin at the most prominent point. Such drainage is not complete and usually constitutes a temporary relief until animals can be marketed.

EXCISION OF THE EYE

The frequency of the occurrence of accidental wounds, abscesses and malignant tumors of the eye of the ox often makes it necessary or desirable to remove the entire structure. We believe that the most satisfactory method of performing this operation involves the complete removal of the conjunctiva so as to prevent the formation of secretions which result in constant discharge.

To perform the operation, confine the animal on the table or ground, and carefully remove, by shaving, the hair of the lids and surrounding area and paint the surface with tincture of iodine. With a small hypodermic needle inject subcutaneously a liberal amount of local anesthetic, such as 1 per cent solution of stovaine, apothesine or procaine, containing adrenalin chloride in a 1-to-5,000 solution, into the upper and lower lids, about 1 cm. from the border of the lids. Follow this by injecting about 1 c.c. of the same solution at four different points into the depths of the region posterior to the orbit.

Suture the upper and lower lids together with a continuous silk suture, confine the skin of the lids with tissue forceps, and with a very sharp knife make an incision through each lid about a quarter of an inch from their borders, uniting the incisions the same distance beyond the lateral and medial canthi. The incision should pass to but not through the conjunctiva. The hemorrhage should at all times be carefully controlled so that this technique may be carried out after completing the incisions to a uniform depth throughout their extent. The conjunctiva is separated from the lids back to its attachment to the orbit. This leaves the conjunctiva attached to the border of the lids, which have been sutured together, and these tissues may then be used to apply attraction upon the orbit. After the dissection has been carried back to the point of insertion of the conjunctiva to the orbit, the muscles of the eye are clipped with a pair of curved scissors and finally the optic nerve is cut in the same manner and the orbit completely removed, the third eyelid being re-

moved with it. All of the periorbital fat should be left in place. The hemorrhage, which is not great, should be controlled with sterile gauze sponges and all blood clots removed from the cavity. The cavity is then packed with sterile gauze dusted with equal parts of chlorinated lime and boric acid well mixed together, or iodoform, and the cut edges of the lids are carefully sutured with interrupted silk sutures beginning at the external angle, omitting the last stitch to provide drainage. Remove the pack in twenty-four hours and inject into the cavity about one-half ounce of Bipp, which is a paste composed of iodoform 16 ounces, bismuth subnitrate 8 ounces, liquid paraffin 8 ounces.

Very little after-treatment will be found necessary. The cavity will fill and the edges of the lids become permanently healed together in about two weeks. The area is finally left somewhat sunken, but the surface is absolutely smooth and no discharging wound remains.

ACTINOMYCOSIS IN THE MANIBULAR AND PAROTID REGIONS

Actinomyces affecting the glands of this region is quite common in cattle and often calls for some form of surgical procedure. There are two methods of dealing with this condition. The one involves complete removal of the diseased tissue and is indicated in case of circumscribed tumors in valuable animals which are to be kept for a considerable period of time. The second involves drainage and proper after-treatment and is indicated in case of butcher animals which are being fed for market. Here it is of advantage to use a method which will control the condition and at the same time incur the least possible loss of time and flesh.

Without enumerating the many problems connected with complete removal of such tumors, due to the large number of important structures in this region, I wish to emphasize a few important points in connection with the technique of the operation.

1. After thoroughly preparing the region and locating as far as possible structures to be avoided, a liberal elliptical incision should be made in a longitudinal direction, which should include any and all fistulous openings and should be large enough to remove all excess of skin due to the enlargement. The incision should be carefully carried to the line of

cleavage between the normal and diseased tissue. This line can be discovered most easily by beginning the blunt dissection as near the base of the tumor as possible at some point from which it will be more easy to work out in all directions than to attempt to find the line of cleavage over the periphery of the tumor.

Following the line of cleavage with blunt dissection, using the scalpel handle or Mayo scissors so far as possible, it should be possible to recognize any important vessels, ducts or nerves before they are sectioned. Vessels which must be cut should be ligated before being cut. Large vessels should be ligated at two points and then divided between these two points. The separation should continue until the tumor has been completely isolated. It is usually found that a small neck of diseased tissue extends into the depths of the region beyond the large portion of the tumor. This should not be cut across but completely removed.

If the wound area is large and important vessels are exposed, the tissue spaces should be closed and protected by suturing the tissues together in the depths of the wound. If there is a parenchymatous hemorrhage, a sterile gauze pack should be placed in the cavity and the skin united with interrupted sutures. It is important to warn the owner against the danger of post-operative hemorrhage, and to prevent this the animal should be closely confined in a stall where there is no opportunity for the animal to place pressure on the jugular region. A course of potassium iodide treatment may be given as a further safeguard against recurrence.

2. The second method has been found to be very practical and satisfactory in case of animals in the feed lot. It consists in thorough drainage of the process, followed by painting the cavity with tincture of iodine and then packing the cavity with gauze upon which has been smeared about half an ounce of paste made of equal parts of zinc chloride and sanguinaria. This pack should be sutured in place and allowed to remain for five to eight days, after which it is removed, together with the slough which has been caused by the pack. If practicable, it is well to carry out the potassium iodide treatment in these cases as well. Under such treatment we have found that the tumors make either complete recovery or sufficient reduction takes place so that the animal can be

marketed without loss, as there is very little if any loss of flesh due to the operation if an animal can be handled in the stocks or chute. For these reasons we believe this method to be practical, although not so satisfactory from a surgical standpoint.

RUMENOTOMY

I will not attempt to describe the indications for rumenotomy, but wish rather to direct attention to some of the important points in performing the operation. Many times the animal is in such a toxic condition that anesthesia is not necessary and the problem of control does not enter into consideration. If this is not the case, satisfactory anesthesia can be obtained by the use of local anesthetics injected subcutaneously along the line of incision. The animal may be controlled either in a standing or recumbent position, according to the circumstances.

After shaving the region of the left flank, the area should be carefully sponged out with bichloride of mercury, 1 to 1,000, and painted with tincture of iodine. The structures to be divided, named in order from without to within, are as follows:

1. Skin.
2. Subcutem and subcutaneous fat in variable amounts.
3. The external oblique muscle. The fibers of this muscle pass the region in very nearly a horizontal direction and are relatively thin.
4. Internal oblique muscle, and those arising from the ilium, whose fibers are considerably thicker and pass in a direction downward and forward, from the external angle of the ilium. A definite branch of the circumflex artery passes along the superior border of this portion of the muscle.
5. Transverse muscle of the abdomen, which in this region is entirely aponeurotic. The fibers extend in a perpendicular direction and are white and glistening in appearance and very thin.
6. The iliac fascia. This structure is thin and yellowish in appearance and is separated from the previously mentioned structure by aureolar tissue.
7. The subperitoneal fat.
8. Peritoneum.

The importance of knowing the various structures which are found in this region is that the operator may be able to recognize each structure by its color and direction of fibers and consequently may know at each step in the operation just how far the operation has progressed.

A perpendicular incision about 8 to 10 inches in length, starting at a point about equal distance from the last rib, the lumbar vertebræ and the external angle of the ilium, should be made through the skin, subcutem and external oblique muscle. The fibers of the internal oblique should be separated in their long direction, across the center of the wound, and likewise the fibers of the aponeurosis of the transverse muscle and the iliac fascia should be divided in the same direction as a skin incision. After separating the fat the peritoneum should be picked up with forceps, incised with scissors or scalpel, and completely divided with a blunt bistoury.

The divided edges of the peritoneum should be secured with forceps, which are allowed to remain in place during the operation. A liberal strip of sterile gauze should be placed within the peritoneal cavity, through the lower commissure of the wound, and finally the rumen divided liberally and the divided edges fixed with forceps or tape. Under this method a free opening is made through the abdominal wall and into the rumen and much less tissue is actually destroyed than by trying to operate by separating all of the muscles in the direction of their fibers.

After emptying at least two-thirds of the contents of the rumen the edges of the wound in the rumen should be carefully cleansed and the wounds united by using one row of interrupted or continuous silk sutures to adapt the edges.

This line of suture should then be buried for a distance of one-half to three-fourths of an inch by the use of a catgut Lembert suture, No. 2 or No. 3, passed in with a round-pointed needle, attempting to avoid passing the needle through the mucous membrane. Particular care should be taken to get equal apposition of the peritoneal surfaces, and especially so at the commissures. Within twelve hours following the operation a line of sutures so placed will be completely covered by a wound exudate and adhesion will begin to form.

After removing the gauze and preparing the wound edges, the peritoneum, still fixed in the forceps, should be pulled up and sutured with catgut. A few catgut sutures may be used to unite the muscle wounds or to obliterate spaces within the tissues, and finally the skin should be sutured with silk, leaving drainage in the lower angle of the wound and the

line of suture protected with gauze and collodion except at the drainage opening.

The points which I wish to emphasize particularly are the importance of the careful apposition of peritoneal surfaces, both visceral and parietal. I am thoroughly convinced that no abdominal wound is properly cared for which does not include these two precautions.

The complications may be peritonitis, abscesses in the wall of the abdomen, and fistula of the rumen. Peritonitis should be treated on general principles and abscesses treated by careful and complete drainage. By using catgut sutures in the depth of the wound I believe the number of abscesses can be reduced. If fistula results, the process should be allowed to heal as completely as it will, and if complete healing does not take place, the final tract should be curetted and cauterized with a hot iron or pure phenol, after which healing usually takes place.

AMERICAN TO DIRECT NEW BRAZILIAN COLLEGE

Dr. Peter Henry Rolfe, of Florida, has been appointed to direct the agricultural and veterinary college which is to be established in the State of Minas Geraes, Brazil. Ambassador Edwin N. Morgan reports that a credit of 1,000,000 milreis has been authorized to meet the initial expenses of the school.

U. S. COWS SUPERIOR

The American milk cows which have been distributed through Bavaria are declared to be better milkers than the German breed. The Bavarian farmers express astonishment that the American cows give about twenty quarts of milk daily after their first calf, which is double the quantity of German cows.

NEW BUILDINGS AT AUBURN, ALA.

The contract for the construction of three new buildings at the Alabama Polytechnic Institute at Auburn, Ala., has been awarded. The transaction involves \$125,000 and the structures are to be completed by January 1. One of the buildings will replace Comer Hall, the big agriculture building. The other structures will be used for veterinary science.

PROGRESS OF BOVINE TUBERCULOSIS ERADICATION IN MONTANA

By W. J. BUTLER

State Veterinarian, Helena, Montana

IN 1911 the Twelfth Legislative Assembly of Montana enacted Chapter 146, "An act to provide for the tuberculin testing of bovine animals, their quarantine, destruction, and disposition under the general supervision of the Livestock Sanitary Board." This law specifically required that all dairy cattle be tuberculin tested and that all reactors be destroyed or segregated and quarantined.

The difficulties that presented themselves in fulfilling this work were many. Montana is the third largest State in the Union; its ranches and dairy herds are widely separated. Practically none of our dairy herds are kept under pasture the entire year around. When cattle are dry they are turned out on the adjacent range. In the foot-hill country barns are made of logs, and in many sections where milking is done only during summer months there are no barns at all. In addition to this, due to the many settlers coming into the State, there are a number of one-cow dairies which carry on a dairy business from time to time as cows come fresh. Taking all of these adverse conditions into consideration, it will at once become apparent that the progress made by the State of Montana in cleaning up its dairy herds and eradicating tuberculosis in livestock is indeed remarkable. It gives a concrete example of what may be accomplished by an active and consistent campaign in the eradication of an infectious contagious disease.

The following table is the official record of the number of animals tested, the number of tuberculous animals found, and the percentage of tuberculosis for the years 1911 up to and including June 30, 1921:

Year	Tested	Tuberculosis	
		Reactors	Percentage
1911	7,799	829	10.63
1912	7,158	481	6.7
1913	6,769	371	5.4
1914	5,788	174	3.0
1915	13,851	345	2.4
1916	9,983	520	5.2
1917	13,781	707	5.2
1918	22,720	1,151	5.0
1919	26,661	752	2.82
1920	29,017	647	2.22
1921 (to June 30)	29,990	260	0.86
Total	173,517	6,237	3.5

It will be noticed that when tuberculin testing was first inaugurated 10.63 per cent of reactors (or tuberculous animals) were found. The second year was practically a retesting of the herds that had been tested in 1911. The percentage fell to 6.7. The testing of 1913-1914 was a repetition of the previous years' testing, in that methods of testing and funds did not permit an expansion of the work or the testing of new herds. Tuberculosis in the herds that had been tested fell to 3 per cent.

On September 21, 1914, the intradermic tuberculin test was officially recognized. This test is commonly called the "tail test." Previous to this time the States of Missouri and California had used the intradermic test, but Montana was the first State to adopt it officially as its recognized test and to guarantee its accuracy by paying the owner of any animal falsely condemned (through the use of the intradermic test) the full and true book value of the animal condemned. I think I may safely state that bovine tuberculosis in western States or in semi-range States will never be eradicated by the use of the old subcutaneous or temperature test. This for the reason that where the temperature test is used only gentle and well broken animals can be accurately tested. With the intradermic test any animal, wild or gentle, young or old, may be accurately tested.

With the adoption of the intradermic test the Livestock Sanitary Board issued an order that all cattle in any herd, young and old, wild and gentle, must be tested. The intradermic test brought to light the fact that calves may suffer from tuberculosis. It also demonstrated the fact that many dry dairy animals that were running out in the hills were also tuberculous. These calves and dry animals could not be tested with the subcutaneous test, and therefore until the adoption of the intradermic test

they were a constant source of reinfection to that particular herd. Strange as it may seem, we have found generalized tuberculosis in calves six weeks old. Such an occurrence hardly seems possible, but it is an absolute fact.

With the use of the intradermic test we were able to test more than twice as many cattle for the same amount of money as we had been able to test in previous years. In 1915 the percentage of reactors fell, even though we tested a number of new herds. The work in 1915 was expanded by testing in the Flathead district, where we tested thousands of cattle without finding one reactor. This is the principal reason for the percentage falling. Even though our percentage of reactors fell in 1915, we found considerable tuberculosis in previously tested herds. We realized there must be some outside source of infection. In most instances we found that their purebred bulls, which had been imported into the State since our last previous test, were tuberculous. These bulls had been shipped into Montana accompanied by an official tuberculin test chart issued by the State from which they originated, stating that the animals were free from tuberculosis and any infectious contagious disease.

To protect the stock interests of Montana the Livestock Sanitary Board issued an order that all purebred cattle shipped into the State would have to be shipped into quarantine and held subject to a 60-90 day retest.

Our figures for 1916 were a revelation. Out of 1,646 purebred animals shipped into the State, accompanied by an official tuberculin test chart, we found when we subjected them to our 60-90 day retest that 145 were tuberculous. No wonder that our herds were becoming reinfected when 8.8 per cent of all purebreds being shipped into the State, even though accompanied by a clean bill of health and tuberculin test chart, were tuberculous.

In 1916 the States of Minnesota, North Dakota and Montana held a meeting to protect themselves against the fraudulent importation of purebred cattle from outside States. This meeting provided for the 60-90 day retest in these respective States, and I feel safe in stating that the nation-wide tuberculosis eradication campaign is the result of the action taken by the States of Minnesota, North Dakota and Montana.

It will be noted that in 1916 our percentage of reactors jumped to 5.2 per cent. The principal reason for this was the testing of imported purebred cattle, and also to the testing of herds

where we knew they had recently acquired imported sires. It will be noticed that our percentage of reactors held fairly even for the years 1916, 1917 and 1918. Due to the enormous distances to be traveled, to climatic conditions, and the financial condition of the Livestock Sanitary Board it took us practically three years to clean up our herds which had been contaminated from outside sources. It might have taken us longer had not the United States Bureau of Animal Industry in 1917 established its cooperative tuberculosis eradication campaign. We did not receive very much help in 1917, but we did receive considerable help in 1918, and ever since that time have received efficient and well directed cooperation from the United States Bureau of Animal Industry.

With the knowledge of the work accomplished and with the careful studying of our official records one is safe in stating that the peak load of our work in bovine tuberculosis eradication has been reached and that gradually, but surely, bovine tuberculosis in Montana is being eradicated.

The figures for the first six months in 1921 indicate beyond words the progress of our work. We have tested 29,990 cattle and have found but 260 tuberculous animals, a percentage of 0.86. In 1922 even this percentage should be decreased, and we sincerely trust that each year it will grow less and that the work of the Livestock Sanitary Board will be crowned with the achievement of having eradicated bovine tuberculosis in the State of Montana.

During the past ten years we have destroyed 6,237 cattle which could have been and which were in many cases a source of infection to the human family. It must also be realized that had these animals been permitted to live they would have infected countless other bovine animals, which in turn would have been a source of infection to the human family. Taking these facts and figures into consideration, the milk-drinking public must realize the protection which is being given them and their children by the Montana Livestock Sanitary Board in the eradication of tuberculosis.

The fact that in 1921 we found only 0.86 per cent of tuberculosis in all cattle tested is a positive assurance to the State and the world in general of the cleanliness and purity of Montana dairy products and the healthfulness of Montana livestock.

PARTURIENT PARESIS OF THE DAIRY COW¹

By A. A. MOTLEY

Alpena, Mich.

PARTURIENT PARESIS is a disease affecting especially the dairy cow following parturition, rarely before or during birth, and is generally of a nonfebrile nature, resulting in a general paralysis, or, in nontreated cases, death.

The cause of this disease is still unknown. Although many theories have been advanced as to the cause, none of them have been generally accepted.

The first symptoms are generally manifest from 12 to 72 hours following the birth, although cases are occasionally met where the first symptoms are noticed within an hour following the birth, and still more rare where several weeks have elapsed. It is a noticeable fact that cases that develop extremely late more often develop tympanites and coma early during the attack. These late cases may or may not be true parturient paresis; in fact, they rather suggest auto-intoxication, but the fact remains that they do answer favorably to the same treatment employed in the typical cases.

The earliest symptoms probably noticed are greatly decreased lactation, uneasiness, treading with the hind feet, possibly getting up and down. This uneasiness continues from one-half hour to several hours, when animal reaches a state when she can no longer stand and goes down, lying on her sternum with her head to her side, tears wetting the face and presenting a picture of absolute helplessness, and if left alone, will gradually pass into a state of coma, when the position is changed to lying flat on the side. The temperature, while generally subnormal, is occasionally found to be as high as 103° F.

I will now discuss the different treatments I have used and results given.

During my early experiences the Schmidt treatment was used, with varied results. The percentage of recoveries with this treatment was not nearly so great as with the air treatment, and

¹Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

sequelæ were far more numerous. Many would gain their feet only to die of pneumonia in a few days; others would develop mammitis, eventually the gland function being lost, and those that did recover did so very slowly. These sequelæ were met regardless of how strict aseptic precautions were employed when treatment was administered.

The next treatment was the trikresol treatment advocated at the time by Dr. Samuel Brenton of Detroit, Michigan. This treatment consisted of trikresol and glycerin, equal parts, 2 drams of this mixture in a quart of sterile lukewarm water and distributed equally in the four quarters of the udder. This treatment gave excellent results, with no sequelæ; in fact, it proved the next best to the sterile air treatment.

The past few years we have had the sterile air treatment and the oxygen treatment. My experience has been entirely with the sterile air, which, on account of the convenience and gratifying results, has been all that could be desired. The results from this treatment have been so favorable that many think that all that is necessary is to inflate the udder of the patient and she will recover. Granting that this is true in the majority of cases, it is for the few that will not, that we deem the following important:

The position in which the patient is kept during the attack is practically as important as the air treatment, as the cow whose udder is inflated and then allowed to remain lying on her side, as they do in the comatose state, has little chance for recovery. The first thing upon arrival is to roll animal upon her sternum and insist that she be kept in this position during the entire time she is unable to stand. One-half a grain of strychnin sulphate is then given subcutaneously, and repeated in six hours if necessary, but I never give more than half a grain for initial dose and sometimes less if the animal is of the small type. The bovine does not tolerate strychnin as the equine, many seeming peculiarly susceptible to its action. Some practitioners prefer atropin, but personally I prefer strychnin, except in those cases where the patient seems very excitable, or those that occur on hot, sultry days. Cases on such days always deserve a more guarded prognosis.

The udder is then inflated after washing the teats and tube with a mild cresol solution. The teats are not tied, as by press-

ing the end of the teat for a few seconds the air will cease to escape. If a case is met where it seems necessary to tie the teats, a piece of gauze bandage may be used, but should only be allowed to remain for a short time. Milking before inflating is not necessary, as a very small amount of milk is present.

In connection with the inflation of the udder, I wish to condemn the use of the bicycle pump as an instrument for this purpose. This practice should be discouraged, as it leaves a bad impression with the client and it may injure the mammary glands. Hemorrhage within the glands has been known to occur following the vicious use of a pump.

It is practically impossible to overinflate the udder with a small hand bulb outfit. If patient does not recover in six hours the udder is reinflated. The cylinder of a bulb outfit should be filled with absorbent cotton which is dampened with a few drops of trikresol or other suitable antiseptic. Personally I am in favor of trikresol for this purpose because of the results obtained with the trikresol treatment.

I have had a few cases die while in the act of inflating the udder, and for this reason it seems best to administer the strychnin before the air, as since following this procedure such a misfortune has never occurred.

After completing all work with the udder, if placental membranes are still retained they should be removed, which, in my experience, is always easily done. The membranes are usually detached from the cotyledons in these cases and lying in the uterus, and when they are attached they can easily be removed by slight traction.

It is important that the attendant be instructed not to milk until the patient has been on her feet and apparently normal in every way for at least three or four hours, and not to give or allow to be given a drench of any nature, as there seems to be danger from such procedure during and for twelve hours following a severe attack. The muscles of the neck and throat seem to be affected in these cases. A guarded prognosis must always be given in those cases which have been drenched before arrival of veterinarian. Catheterization should be performed on all animals which are in a comatose condition and also on those where the attack lasts to exceed six hours.

Occasionally a case is met where the animal regains a per-

feetly normal condition except a refusal to arise; patient eats, drinks and ruminates normally, and temperature, pulse and respiration are normal. Sometimes this continues for several days. One case of this nature, in my practice, crept around the yard eating grass and apparently well in every way, for a week, in spite of every effort to make her arise. Finally one morning the family found her walking around as natural as ever. This animal had been on a strychnin treatment during the entire time she was unable to rise. When this condition is met medical treatment seems of little use and mechanical methods no better, although it is well to continue the strychnin treatment. You may try for an hour or two to make a patient of this kind arise, and fail, leave the barn for half an hour, and return to find her up and acting as though nothing had happened. Upon examination of these cases after they had arisen I have never noticed any muscle atrophy or other condition that would lead me to believe that any pathological condition had caused the animal to remain down longer than the usual length of time. It is probable that muscular weakness is in a measure responsible for the condition.

In closing I will say that I have never seen a case in a primipara or following other than a normal birth, and never a case with retained placenta that the membranes were at all firmly attached to the cotyledons.

Many cows suffer attacks each succeeding year; others never have a second attack, and some suffer an attack every other year. I recall treating one family cow four times in eight years. Each time the animal presented a well-developed case of parturient paresis, the peculiar incident being that she was attacked every second year.

No case is too far gone to respond favorably to proper treatment unless the patient is dead upon arrival of veterinarian.

Due to the fact that the cause is still unknown, nothing has been successfully done along the lines of prophylaxis.

(NOTE.—Discussion of this paper will appear in the next issue of THE JOURNAL.)

STRONGYLIDOSIS IN THE HORSE ¹

By C. H. COVAULT

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STRONGYLIDOSIS is a febrile, enzootic disease of horses and mules which is characterized by enteritis, progressive emaciation and anemia, and caused by certain of the nematodes belonging to the family Strongylidæ. The disease is seen only in young animals from three months to five years of age, though the parasites are seen in horses of all ages. The condition has been described under the names sclerostomiasis and strongylosis, but the foregoing term seems preferable in the light of our present knowledge of the etiology of the disease.

In the State of Iowa alone, hundreds of young horses have died from this disease in the past few years, and information reaching us indicates that the losses are as severe in other States and that it occurs in most of the States of the Union. It is especially prevalent in the States of the Mississippi Valley, having been reported from Minnesota to Louisiana. It has been reported from the Southern States and as far west as Montana. We can see no reason why the disease should not be found in all portions of the United States where young animals have access to wet, swampy pastures, as it is from such that infestation occurs.

While our knowledge of the etiology of this disease may be lacking in certain details, we know that it is caused by certain nematodes of the family Strongylidæ, hence the name strongylidosis. Of the many parasites revealed by postmortem examination of animals dead from strongylidosis the most constant offenders and of first importance are the three species of the genus *Strongylus*, namely, *S. vulgaris*, *S. edentatus* and *S. equinum*. These three have been classified as belonging to the genus *Sclerostomum*, hence the name sclerostomiasis. Furthermore, both *Strongylus vulgaris* and *S. equinum* have been designated as *S. armatus*.

¹ Presented at the fifty-seventh annual meeting of the American Veterinary Medical Association, Columbus, Ohio, August, 1920.

It is from the standpoint of the practicing veterinarian that this discussion is entered into and I feel safe in saying that it is seldom that the practitioner so familiarizes himself with these parasites as to enable him to identify the different species, but the genus can usually be determined with a fair degree of accuracy.

The strongyli, being blood-suckers, vary in color from a pale pink to either a bright or bluish red depending upon the amount of blood they contain. They vary in size from $\frac{1}{4}$ to $2\frac{1}{2}$ inches in length and from the size of a thread to one-sixteenth of an inch in thickness, the size depending upon the age, sex and species.

Probably the most common companions of the strongyli are the various species of the genus *Cylicostomum*, considered by many investigators in the past as being one and designated by some as *Cyathostomum tetracanthum*, by others as *Strongylus tetracanthus*, and by still others as *Sclerostomum tetracanthum*. It has been determined, however, that the small, threadlike white worms seen in such great numbers and commonly referred to as tetracanthus and as belonging to some one of the three genera just mentioned represent in reality at least twenty-two species of the genus *Cylicostomum*. In addition to these, Looss recognizes one species of the genus *Æsophagodontus*, *Æ. robustus*; five species of the genus *Triodontophorus*, *T. serratus*, *T. minor*, *T. brevicauda*, *T. intermedius* and *T. tenuicollis*, and two species of the genus *Gyalocephalus*, *G. capitus* and *G. equi*. The part played by each of these in producing the disease is not known, but the greater part of the damage done is attributed to the three strongyli.

It is quite generally believed that the life histories of the various genera of the family Strongylidæ herein mentioned are much the same. The adult parasites inhabit the intestinal lumen, where they lay eggs, which are voided with the feces. Under favorable conditions of temperature and moisture embryos are developed after a very few days. The embryos moult one or more times, and after moulting are very resistant and will live six to eight months in moist manure or in water. These embryos are taken into the digestive tract of the host with contaminated food or water, and either finish their life cycle in the lumen of the bowel or encyst themselves in the intestinal mucosa or sub-

mucosa until sexually mature, when they emerge, copulate and repeat the life cycle. When burrowing the embryos sometimes pass through the wall of the intestine and become encysted beneath the serous membranes or in the lungs, liver or pancreas, or they enter the blood vessels. Larvæ of *Strongylus vulgaris* are commonly found in the mesenteric arteries or their branches, where they produce thrombosis and aneurisms. They have occasionally been found in the pulmonary, uterine and iliac arteries or their branches, where they produce thrombosis and aneurisms. They have occasionally been found in the pulmonary, uterine and iliac arteries, where they produce like lesions. Larvæ of *S. edentatus* are commonly found beneath the serous membranes, and those of *S. equinum* are commonly found in internal organs. It was formerly taught as a part of the life history of *S. vulgaris* that the larvæ developed in the blood stream until reaching a form resembling the adult, though without sex organs; at this stage it detached from the aneurism, passed to the walls of the cecum, where it became encysted; later the cyst opened into the lumen of the cecum, setting free the sexually mature worm. It is now believed by many that the larvæ in the blood vessels arrive there through accident and while they may reach sexual maturity do not reproduce.

The injury to the host is probably due to the combined effects of the mature and immature worms. The constant irritation of the blood-sucking adults together with the irritation from the encysted larvæ leads to a chronic thickening of the intestinal wall, with a resultant loss of function, leading to digestive disturbances, as evidenced by diarrhea, etc. This hindrance to absorption from the intestinal tract, together with the loss to nutrition through the blood-sucking parasites, as well as the loss to the host from the absorption of nutriment from the intestinal lumen by those parasites not bloodsuckers, rapidly depletes the system of the undeveloped host, leading to emaciation and anemia.

It is the belief of the writer that the presence of larvæ in the mesenteric vessels has little or nothing to do with the disease in question. It is true that this accident sometimes produces death through thrombosis and embolism, but clinical experience and postmortem findings do not indicate that this process operates to any extent in the production of the symptoms characteristic of

the condition which we term strongyloidosis or sclerostomiasis; therefore, consideration of thrombo-embolic colic does not seem advisable in this discussion. The mechanical injury to the intestinal mucosæ by the adults and immature parasites opens up paths for infection leading to local or metastatic abscess formation or enlargement and infiltration of the mesenteric lymph glands, resulting in an edematous condition of the intestine, or it may result in general infection hastening death. Likewise, death may result unexpectedly from peritonitis and septicemia through the rupture of a subperitoneal abscess.

Another factor, possibly of great importance in the production of symptoms and death, is the effect upon the host of toxins liberated by the parasites under certain conditions. In outbreaks where losses have been extensive and where deaths have been sudden and unexpected we have been unable to attribute the losses to any cause other than an intoxication. Postmortem examination in such cases revealed no changes other than those in the intestinal wall, and no symptoms had been manifested until a few hours preceding death. It is known that many of the other parasites infesting the intestinal tract liberate toxins having a marked effect upon the host. With reference to the toxicity of the strongyli the following abstract from the *Journal of Agricultural Research* is of interest:¹

This is a biochemical study of the parasite *S. equinum*. From the results it is seen that this organism contains fats, fatty acids consisting chiefly of butyric acid, soaps, mucin, albumoses, purin bases and creatin, a ptomaine, a crystallizable alkaloid, an amino acid, and an amorphous substance containing a nonprotein nitrogen and phosphorus which gives the precipitating reactions for an alkaloid. The cuticle of this parasite was also found to contain a unique protein combination which has no relation to chitin.

Contrary to the findings of Weinberg, an alcoholic extract of the parasite was found to possess a strong hemolytic power. The soaps, fatty acids, crystallizable alkaloids, and ptomaines were active in the hemolytic process. The parasite further secretes a lipase which is capable of digesting the fat contained in horse serum. This lipase, according to the author, plays an active role in hemolysis. The bilirubin of horse serum is changed by the cellular activity of the parasite.

Upon autopsy of the usual fatal cases of strongyloidosis one is attracted by the markedly emaciated, anemic cadaver. Often there is edema of dependent portions. Upon opening the abdominal cavity, cysts containing the larvæ, small abscesses re-

¹A chemical study of *Sclerostomum equinum*. T. Bondouy. Arch. Par. 14 (1910), No. 1, pp. 5-39.

sulting from these, or nodules resulting from the healing process are noted beneath the peritoneum. Often small hematomata are noted in the peritoneum. The mesenteric lymph glands are sometimes enlarged, and the subperitoneal tissue in such cases shows an edematous infiltration with an amber-colored fluid. The walls of the cecum and large colon are thickened and sclerotic and contain cysts and abscesses. The mucosa shows innumerable small red spots due to the piercing of the mucosa by the blood suckers and is thickly studded with small reddened elevations which contain larvæ. Ecchymotic hemorrhages are commonly present in the different coats of the small intestine. The lumen of the intestine usually is filled with a wriggling mass of parasites, millions of them being present free in the lumen and mixed with the ingesta and great numbers attached to the mucosæ.

The embryos are ingested by the host during the late spring and summer and sometimes produce symptoms of disease as early as November or December. Usually in our locality the cases are called to the attention of the veterinarian during the first four months of the year, though it may be much later, and as seen by him can be divided into two classes, the difference in the two being only in the extent of development of the symptoms. The interval between the ingestion of the embryos and the appearance of the symptoms as well as the severity of the symptoms depends upon the extent of the infestation and the resistance of the individual, the latter being determined largely by the feed and care the animal receives.

Upon those farms where the feed and care of the colts is given proper attention, or in herds where the disease has previously existed and the owner is alert, the veterinarian is called early and given the history that the colts are unthrifty in spite of proper care and judicious feeding. If any of the affected animals happen to be used for work it is further reported that these tire easily. Upon examination one finds signs of malnutrition, rough hair coat, leathery, harsh skin, and fair or poor condition of flesh. Quite commonly local sweating is observed, especially in the region of the flanks. Pulse, respiration, temperature, mucous membranes and appetite appear normal. Feces are usually normal, but in some cases there are indications of an intestinal catarrh, the feces being of softer consistency and malodorous, with the peristalsis active.

The second class of cases is characterized by the severity of the symptoms and are most often met with on those farms where the growing animals are allowed to "rough it" through the winter months, *i. e.*, feed in the cornstalk pasture with little or no shelter. They also occur under the best of hygienic conditions where the infestation is great or where for any reason the individual resistance is not marked. There is usually a history that the animal has lost flesh and strength rapidly; has a profuse diarrhea and marked thirst; appetite normal, increased or variable. The principal symptoms are extreme emaciation, weakness and exhaustion. The hair coat is rough, bones prominent and the eyes sunken. The visible mucosæ are anemic and often edematous. Peristaltic sounds are loud, and a watery, fetid diarrhea persists which soils the tail and buttocks. If the patient is seen when still able to walk it is noticed to have a staggering gait especially noticeable in the hind legs. Often the veterinarian is not called until the animal is recumbent from weakness. The pulse is weak, thready and irregular, often intermittent. Edema of dependent portions is frequently present. The temperature is normal except where elevated from secondary infection. Where daily temperatures are recorded in the febrile cases the fever is found to be irregular or intermittent. In recumbent patients areas of decubital gangrene are seen.

The course varies from two weeks to two months from the first appearance of symptoms, the variation being due to the factors mentioned as determining the character of the symptoms together with the extent of bacterial invasion of the traumatic lesions and the location and character of the accidental lesions produced by the larvæ.

In the first class of cases the prognosis is good providing proper curative measures be early inaugurated. In the advanced cases the prognosis must be guarded, since the mortality rate is sometimes very high. Death is usually due to exhaustion following a prolonged, progressive emaciation and anemia. It must also be borne in mind that death may come earlier from any of the following:

- (a) Thrombosis of the mesenteric arteries.
- (b) Peritonitis, due to intestinal perforation at the site of a verminous cyst or from rupture of a subperitoneal abscess.

(c) General infection taken up through the traumatic lesions in the intestinal mucosæ.

(d) Septicemia from decubital gangrene following great weakness.

(e) Internal hemorrhage from the rupture of an aneurism.

Furthermore, recoveries are often incomplete, it being impossible for the severely injured intestinal wall to resume its normal functions. The walls are thickened, the circulation impeded, the mucosa contains much scar tissue, and absorption is interfered with permanently so that nutrition is impaired. There is chronic indigestion with constant or intermittent diarrhea, the appetite is capricious and emaciation persists.

Diagnosis is not difficult in districts where infestations are common. Features which lead to suspicion are: History of the patient having pastured on low, poorly drained or marsh land, or having been sufficiently exposed to animals known to have been infested; the enzootic character; the season of the year at which the symptoms appear; the gradual intensification of the symptoms as already outlined. Of especial diagnostic importance is the finding of the worms in the feces. When diarrhea is present the worms are easily seen in the freshly voided feces, or if the arm is inserted into the rectum the worms will be seen on the hand and arm when it is withdrawn. Errors are not uncommon in cases where diarrhea is not present. The feces contain few or no worms. Rectal exploration may fail to reveal their presence. Where the history and symptoms indicate an infestation the diagnosis should be withheld until a purge has been administered and a reexamination made during the period of purgation, when in positive cases the parasites will be found in great numbers. It must be remembered that these parasites can be present in an individual without producing disease, so that the mere finding of the parasites is not of sufficient importance to exclude the necessity of further careful physical examination. In our locality laymen who have had previous experience frequently make a diagnosis and call at the office asking to have their colts treated for "little red worms." In those districts where infectious anemia exists the two diseases can be easily confused. It is reported that in infectious anemia there is a gradual increase in the temperature from day to day which might assist in the differentiation.

Treatment consists primarily in attempts to remove the parasites and to build up the resistance of the patient. To remove the parasites from the intestinal tract we prefer a combination of tartar emetic and ferrous sulphate, 1 to 2 drams of the former and 2 to 4 drams of the latter, the dosage depending upon the age, given daily in capsule or on a small amount of feed until six doses have been given. This we prefer to give in the morning before feeding. Unless the severe diarrhea or the weakness of the patient forbids, this six-day treatment should be preceded and followed by a purge. For this purpose aloes is to be preferred. Leneveu recommends 2 to 5 drams of carbon bisulphide given in capsule for five days and followed on the sixth day with a purgative, preferably magnesium sulphate. Turpentine in oil at intervals of three or four days has also given fair satisfaction. Thymol in ounce doses given after a period of fasting has, according to our limited observation, given only fair results. Oil of chenopodium given in from $\frac{1}{2}$ to 1 ounce doses following 24 to 36 hours fasting and followed by an aloes purge is said to give good results.

At the time of our first visit we administer 20 to 30 grains of atoxyl or 30 to 45 grains of sodium cacodylate intravenously, and repeat this dosage in ten days to two weeks. Rarely a third dose is given at the same interval. Where recovery is delayed we repeat the administration of tartar emetic, ferrous sulphate and sodium cacodylate after three weeks.

While the great value of the preparations of organic arsenic can not be denied, there is some difference in opinion as to how the beneficial action is exerted. It is stated that when given subcutaneously or intravenously they destroy the mature worms in the intestinal tract. Also that repeated doses destroy the encysted larvæ. The marked improvement following their use leads one to suspect that this may be true. It has been particularly emphasized that the marked improvement is due to the destruction of the larvæ in the blood stream, and while this action probably takes place, and if so is of value in the end, it is difficult to believe that their destruction could have any appreciable effect on the course of the disease under discussion. Leneveu recommends sodium cacodylate because of its alterative tonic effect, and it is possible that the beneficial results come as a result of this action.

Further tonic treatment consists in the administration of strychnine and inorganic arsenic in proper dosage. To allay intestinal irritation and control the diarrhea, salol, bismuth subnitrate or precipitated calcium carbonate should be administered.

Attempt to combat heart weakness with subcutaneous injections of camphor in oil or digitalis may be used per os.

Complications must be treated as they appear. Decubital gangrene should be guarded against in the weakened patient by the use of slings.

Marked weakness or threatened collapse is combated by the subcutaneous injection of from 1,000 to 2,000 mils of sterile normal saline solution.

Of first importance is the allowance of a generous diet, and this phase of the treatment can not be overemphasized.

In addition to the dietetic and medicinal treatment, prophylactic measures must be inaugurated to prevent infestation. Attempts should be made to secure proper under-drainage of all marsh land. Horses should be kept away from poorly drained pastures and care should be taken that the hay be free from contamination. The drinking water should come from deep wells or should be filtered. Infested animals should be isolated and their quarters frequently cleaned and disinfected and provided with clean bedding.

Livestock improvement, sectional in many cases, has advanced rapidly during the past two years through the influence of the nation-wide purebred sire campaign. Horsemen in the mid-western horse-producing States have perhaps said less about their attainments than their cattle-breeding brothers, but they have been plodding along, getting their results just the same.—*Breeder's Gazette*.

They were in a railway train and were discussing Dickens. "Well," said one, "John puts 'Bleak House' first and 'Martin Chuzzlewit' second." "Excuse me, gentlemen," said a husky voice from the seat behind. "I don't know your pal, John, but you're being steered. There ain't no such horses runnin'."—*Fort Worth Star-Telegram*.

BOTULISM IN SWINE AND ITS RELATION TO IMMUNIZATION AGAINST HOG CHOLERA

By ROBERT GRAHAM

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THE pathogenic significance of secondary bacterial invaders in hog cholera has been a subject of investigation since the development and application of the Dorset, McBryde and Niles anti-hog-cholera serum and virus treatment. Notwithstanding the reduced mortality from hog cholera due to the widespread use of anti-hog-cholera serum, the loss in swine immunized against hog cholera has yet been a heavy drain upon the swine industry. Beginning in 1918 bacteriological investigations of swine diseases occurring in Illinois were projected at the University Laboratory of Animal Pathology. The outbreaks coming within the scope of these investigations may occur following the administration of anti-hog-cholera serum and virus (one week to 90 days), and untreated young pigs on infected premises may frequently be chronically afflicted. The possible relation of the serum and virus treatment to the losses in question has been suggested, though the exact connection of same has long been a matter of conjecture.

The disease in question is marked by gross pathological changes in affected animals, which include a hemorrhagic inflammation of the lymphatic glands with petechial hemorrhages in the serous and mucous membranes when accompanied by hog cholera. An interstitial pulmonary edema with catarrhal pneumonia and pleuritic adhesions may be observed in some cases. The intestinal wall is thickened in the early stages of the enteric type of the disease, while circumscribed necrotic spots are visible on the serous covering of the intestine. In cases of long standing diffuse areas of diphtheritic gastro-enteritis have been encountered. The latter lesion is more commonly observed in young pigs. The heart, kidney, and liver show varying degrees of parenchymatous degeneration.

In etiologic studies a filterable virus test for hog cholera has generally revealed the presence of a low-grade hog-cholera virus, providing the animals have been previously immunized

against cholera. In a few untreated herds, where the disease may assume a more chronic course, the filterable virus of hog cholera could not be consistently demonstrated by the usual methods. Since the virulence of hog-cholera virus is diminished by filtration, the negative results are subject to further study before final conclusions are formulated.

Bacteriological studies of tissues from afflicted animals in 30 spontaneously affected herds frequently revealed the presence of *Bacillus suispestifer* and related organisms of the paratyphoid group, while *B. necrophorus* was demonstrated in certain local lesions together with extraneous Gram-negative and positive spore-bearing rods. The latter tinctorially and morphologically resembled *B. botulinus*, while subsequent cultural, toxogenic and serologic tests confirmed the identity of this microorganism. One or more afflicted pigs were submitted from each herd. Ninety per cent of the outbreaks were related to *B. botulinus* type A. Moreover, *B. botulinus* type A has been frequently encountered in the surface soil of many of the infected premises.

The syndrome observed in affected animals may vary in intensity, depending upon the age of the animal and the presence or absence of hog cholera. In mildly affected animals following immunization, weakness or stiffness in the hind legs with knuckling of the pasterns may be noted. Unthriftiness and drooping ears followed by a variety of nervous manifestations appear. Muscular twitching of the tail is observed in some animals. Occasionally a typical case of posterior paralysis or gluteal neurasthenia may develop. The breathing in advanced cases may be shallow with or without a thumping movement in the flank. Dyspnea and nasal catarrh give rise to a wheezing sound during inspiration. Conjunctivitis with a muco-purulent discharge may prevail in some animals and the eyelids become firmly glued together. Visual disturbances are commonly observed independent of inflammatory changes in the conjunctiva.

The sporadic syndrome briefly described may be reproduced by injecting hog-cholera serum and virus with varying amounts of botulinus toxin, while toxin injected per se in young pigs results in unthriftiness and malnutrition, with enteric and pulmonary disturbances analogous to those observed in pigs on naturally infected premises.

The not infrequent occurrence of the disease or diseases referred to above throughout the Corn Belt following immunization against hog cholera suggested its probable relation to the serum and virus treatment. In order to obtain bacteriological evidence on this point seventy-four samples of commercial hog cholera serum and virus were examined with special reference to anaerobic flora. Many different species of anaerobes were encountered, but it seemed significant that 16 per cent of the samples purchased in the open market proved positive to *B. botulinus* type A. Of this number 10.8 per cent of the positive samples were hog-cholera virus, and 5.2 per cent were hog-cholera serum. The serum and virus samples included in this series were in many instances of the same serial number employed in the treatment of herds that developed illness subsequent to immunization, and it is presumed from the preliminary evidence that a higher percentage of the commercial anti-hog-cholera serum and virus is contaminated with toxogenic strains of *B. botulinus* type A, while the possible significance of other pathogenic anaerobes has not as yet been eliminated from consideration. The possibility of botulism in sick herds following hog-cholera immunization should not be disregarded, though the filterable virus of hog cholera has been demonstrated in a majority of outbreaks.

In the light of bacteriologic and serologic tests it is apparent that hog cholera is the predominating disease in post-vaccination illness in swine. The incubation and development of cholera in recently immunized herds in our judgment may be traceable to the fact that the serum and virus treatment is simultaneously superimposed upon a specific botulinus intoxication which lowers the resisting powers of the animal and permits the development of a latent and low-grade cholera.

Aerobic pathogens such as *Pasteurella suisepitica* and several unidentified saprophytes in the tissues of afflicted animals do not appear to be a significant or primary factor in the losses. In fact the administration of bacterins prepared from the hemorrhagic septicemia group have been found not only worthless, but detrimental in preliminary experiments. On the contrary the injection of botulinus antitoxin type A in so-called "breaks" following immunization, in preliminary trials under field conditions, is highly efficacious, providing hog-cholera virus infection

is eliminated or subjected to control by the administration of a second dose of anti-hog-cholera serum.

The logical procedure to be tentatively recommended in avoiding loss subsequent to immunizing hogs with commercial anti-hog-cholera serum and virus as at present prepared, consists of a prophylactic injection of botulinus antitoxin (500 units) to offset the specific intoxication which may be produced by the use of serum and virus, until a better means is devised to eliminate all possibility of infected serum and virus. Furthermore, the relation of a food intoxication which might result from contaminated rations fed incident to immunization further justifies this prophylactic treatment. On infected premises pigs should be treated before symptoms of unthriftiness and malnutrition appear, since the curative effects of the antitoxin are limited. Chronic cases which at autopsy show well-organized secondary and nonspecific lesions of enteritis are amenable only to early treatment with botulinus antitoxin. On the contrary, bacterins of the hemorrhagic septicemia group, sometimes recommended in the treatment of such conditions, have proven detrimental in preliminary experiments.

Dr. L. M. Buffington has been transferred from the Government tick-eradication force in Arkansas to hog-cholera work in Iowa.

Dr. W. M. MacKellar, who for some time has directed the Bureau tick-eradication work in Georgia and Florida, has been transferred at his own request and assigned to the position of inspector-in-charge of field work and hog-cholera control in California, with headquarters at Sacramento. Dr. S. J. Horne assumes the duties formerly performed by Dr. MacKellar, with headquarters at Atlanta, Ga.

Doctors J. R. Wirthlin and A. M. Kirkpatrick have resigned their positions on the tick-eradication force of the Bureau of Animal Industry in Georgia.

Dr. Edward Horstman, of the Federal tick-eradication force, has been transferred from Louisiana to Georgia.

Dr. George M. Paxton is now acting inspector-in-charge of this work in Louisiana.

A TRIBUTE TO DEAN W. HORACE HOSKINS

By WILLIAM HERBERT LOWE

Paterson, N. J.

FORTY years ago William Horace Hoskins was graduated from the American Veterinary College, New York City. He was then twenty-one years of age, possessed of an indomitable will and a high purpose. He had learned how to study and had been inspired to greater things. It was at the feet of Liautard and his confreres that Hoskins commenced his notable career.

Ability, industry and loyalty were outstanding characteristics of the man. He was a remarkable leader in the profession. As an organizer, local, State and national, his achievements are unparalleled in the annals of the veterinary profession in America.

In the upbuilding of the American Veterinary Medical Association, which organization has become the largest and most influential veterinary association in the world, Hoskins played a most conspicuous part. He served the association as secretary for a time and later as president for a term of three consecutive years. He enjoyed the unique distinction of never having missed attendance at an annual meeting of the American Veterinary Medical Association and also of the Alumni Association of his Alma Mater, during the entire forty years of his professional activity.

From the day of the organization of the Federal Bureau of Animal Industry, in 1884, until the day of his death, he was a pillar of strength to that great department of our national government.

The present high status of the veterinary service in the United States Army is the result of twenty-five years of arduous labor on the part of our deceased brother who was largely instrumental in placing an act of Congress on the statute books in 1916, providing for commission and rank for veterinarians in the United States Army.

To recount his great work in his native State of Pennsylvania would be a task beyond the limits of the present hour. Leonard Pearson and W. Horace Hoskins were indeed a team

that has not been matched since the death of the former and great were the achievements for the University of Pennsylvania and for the Commonwealth.

Dr. Hoskins served the State Board of Veterinary Medical Examiners of Pennsylvania as secretary and executive officer for sixteen consecutive years. He was honored with the presidency of the Pennsylvania State and Keystone Veterinary Medical Associations, and also held the professorship of veterinary jurisprudence in the University of Pennsylvania for many years. He was an honorary member of the veterinary associations of a number of States, also of other scientific and fraternal organizations.

Our brother distinguished himself also in the field of journalism. He became editor-in-chief of the *Journal of Comparative Medicine and Veterinary Archives*, the lamented Rush Shippen Huidekoper being his associate in his editorial work.

Dr. Hoskins was a convincing and brilliant public speaker and has been referred to by his friends as the "silvered tongued orator" of the profession.

He was not a laboratory man or research worker, but he had the faculty, developed to a remarkable degree, of being able to appropriate and utilize the discoveries made in the laboratory to the advancement of the profession and the uplift of mankind.

A biographical sketch of Dr. Hoskins has been given a place in "Who's Who in America" and also in "American Men of Science."

Four years ago, upon the death of Dean William J. Coates, Dr. Hoskins succeeded to the Deanship of the New York State Veterinary College at New York University, whereupon he moved from Philadelphia to New York. His wonderful work here is so recent and familiar to us all as not to need review at this time, but let it be recorded that in placing veterinary education at its birthplace on this continent upon a more substantial and enduring basis than it had previously occupied, he performed a Herculean task which has been highly commended by true lovers of a noble profession.

Dean Hoskins is survived by his wife Annie E. (née Cheever) and a daughter, Mrs. Margaret E. Hofstetter of Philadelphia; also two sons, Dr. H. Preston Hoskins, Detroit, and Dr. Cheston M. Hoskins, Philadelphia, both of whom are veterinarians, and

seven grandchildren. He is also survived by a brother, Professor J. Preston Hoskins of Princeton University. We would extend loving sympathy to his family in their bereavement.

He was a God-fearing man of splendid character, respected and esteemed. The foundation stone of his monument is already built in this college, which was so dear to his heart. The veterinary faculty of New York University has lost its distinguished Dean and the veterinary profession of the State, the Nation and the world, one of its strong men.

A London cable to the *Philadelphia Ledger* says: "The royal commission appointed to consider the removal of the embargo upon Canadian store cattle, or cattle for slaughtering purposes, reported September 15 that the removal would tend to increase the meat supply of the country and lower the price. The report expresses the opinion that Canadian cattle are healthier than Irish cattle or British cattle. As to the danger of diseased cattle crossing the border from the United States into Canada, the commission says: 'There is no record of anything of the kind at any time. Canadian cattle are all branded with distinctive marks, and with ordinary care there is little chance of United States cattle being sent to this country as Canadian cattle.' "

American Hereford Journal says: "The purebred-sire campaigns carried on by Federal and State authorities, livestock associations and breed papers have shown to the farmer the value of purebred sires in their herds, and have created a desire for ownership. Now that the prices of good sires are greatly reduced, these desires can be gratified. The way is prepared and the field is large."

Dr. J. W. Etheridge, who has been on hog cholera work in North Carolina, has resigned from the service of the Bureau of Animal Industry, effective September 15.

Dr. F. H. Schleich, formerly of the Federal hog cholera force in Tennessee, is now doing meat inspection work at Chicago, Ill.

EXPERIMENTS TO DETERMINE THE VALUE OF CHICKEN-POX VACCINE¹

By FRED BOERNER, JR., and E. L. STUBBS

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THE EXPERIMENTS herein recorded were carried out by the Pennsylvania Bureau of Animal Industry, first, as the result of numerous inquiries from poultrymen regarding the value of chicken-pox vaccine or bacterin, and second, of our failure to find anything in the literature which could be considered as conclusive proof that such products were valuable and worthy of recommendation. The works of Manteufel (1), Hadley and Beach (2) and Mack and Records (3) fail to furnish the proof that we desired.

Since the beginning of our work Beach (4) has reported further investigation upon this subject. He found that a vaccine was valuable as an adjunct to other remedial measures. One experiment was cited in which 168 diseased fowls were vaccinated and given local treatment, and a like number left as controls which were given local treatment but not vaccinated. Of the vaccinated the mortality was 19.6 per cent and of the controls 39.9 per cent. The average number of days required for recovery of the vaccinated fowls was 10.8 and of the controls 13.7.

He further states that the vaccine is designed for and chiefly used as a preventive, and following experiments carried out in California in 1914 its use was recommended to commercial poultrymen. In one year over 300,000 birds were vaccinated in California with vaccine prepared by Beach. A series of experiments was cited in which 1,026 healthy fowl were used, 900 vaccinated and 126 left as controls. They were then exposed to infection, with the result that 11 per cent of the vaccinated and 86 per cent of the controls became infected.

Beach's method of preparing the vaccine is different from that of previous workers in that only scabs are employed, these being obtained from artificially infected fowl. The scabs are

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

thoroughly dried and then powdered. One dram of the powder is diluted with 100 mils of physiological salt solution, and of this 1 mil represents the amount to be injected.

Our first attempts to prove the value of chicken-pox vaccine were carried out during the spring of 1920 in two large, badly infected flocks. The vaccine was prepared according to the method employed by Hadley and Beach and which was also used by Mack and Records. The heads of badly affected chickens were brought to the laboratory, where the scabs from combs and wattles, the pseudo-membranes from mouth and throat and the cheesy collection around the eyes were removed, finely minced and triturated with a small amount of normal salt solution. The mass was allowed to macerate in the ice-box over night. It was then filtered through cotton, diluted with salt solution, and finally heated to 58° C. for one hour.

EXPERIMENT NO. 1.

The farm, located in York County, Pennsylvania, was visited March 17, 1920, at which time the flock was found to be badly infected with chicken-pox and the mortality high. The owner stated that it was the first outbreak of its kind he had had and that the flock had been suffering from it the greater part of the winter. He was willing to allow us to vaccinate a portion of the flock and leave the remainder as controls. Heads showing marked lesions were collected and brought back to the laboratory for the preparation of the vaccine.

As shown in Table 1, the birds were kept in four houses, numbered respectively 1 to 4. In houses 1 and 2 there were three pens each, designated by the letters A, B and C, while houses 3 and 4 contained but two pens each.

During the week following the original visit all the fowls in house No. 2 and one pen in house No. 3 and one pen in house No. 4 were vaccinated. One pen in each of houses 3 and 4 were left as controls. On this same date one pen in house No. 1 was given a second injection, and on April 1 one pen in house No. 3 was injected the second time.

In the course of the experiment the owner kept records of the number which died in the various pens and a record of the egg production for 21 days subsequent to vaccination.

On May 19 we visited the premises and found a marked im-

provement, there being but few birds affected. The control pens appeared to be in as good condition as the others.

We have summarized the results in Table 1, a study of which can allow but one conclusion, and that is that the vaccine was not demonstrated to be of any value. The best control we had was in case of house No. 4, where the number of affected and healthy birds were in about the same proportion in both pens and the results were practically the same in both, whether vaccinated or not.

It is to be noted that in house No. 1, pen C, and house No. 3, pen A, where the fowls were given two injections, the mortality was very much higher. This was probably due to the fact that these two pens were in bad condition when first treated, having a larger number of affected birds than the other pens. The high mortality also influenced the egg production per hen.

TABLE 1.—RESULTS OBTAINED IN EXPERIMENT NO. 1.

House	Pen	Number affected	Number healthy	Date of first vaccination	Date of second vaccination	Mortality subsequent to vaccination	Per cent mortality * subject to vaccination	Egg production 30 days	Eggs per hen
1	A	44	57	Controls	Controls	12	11.8	1,527	14+
	B	50	22	3-20-20	.....	11	15.2	993	13+
	C	63	35	3-20-20	3-27-20	30	30.6	737	7+
2	A	45	58	3-27-20	.....	9	8.7	2,460	13+
	B	16	52	3-27-20	.....	10	14.7	.....	.....
	C	12	77	3-27-20	.....	5	5.6	1,343	15+
3	A	67	23	3-27-20	4- 1-20	55	61.1	811	9+
	B	26	69	Controls	.....	25	26.3	1,166	13+
4	A	20	65	Controls	.....	12	14.1	1,051	12+
	B	29	59	3-27-20	.....	10	11.3	1,095	12+

* Mortality includes all deaths from March 20 to May 19.

EXPERIMENT NO. 2.

This flock was located on a farm in Luzerne County, Pennsylvania. The disease appeared during the month of April. On May 13 we visited the farm and arranged with the owner to vaccinate a portion of the flock and collected material for the preparation of vaccine.

On May 20 we returned prepared to carry out the treatment. The flock was kept in eight different houses, and of these three were picked as being the worst affected and were selected for treatment. Each bird was injected subcutaneously with 1 c.c. of the vaccine. The houses which contained those treated were

No. 3, in which 178 were healthy and 333 affected; No. 4, with 82 healthy and 99 affected; and No. 6, with 136 healthy and 200 affected. Those in houses 1, 2, 5, 7 and 8 were left as controls.

The results of this experiment are shown in Table 2, and it is to be noted that the mortality for three weeks subsequent to vaccination was about one-half that for the three weeks prior to vaccination in both groups. This warrants the belief that the use of the vaccine in this outbreak certainly did no harm, but it is questionable if it was of any value as a means of checking the disease. The egg production was practically the same in both groups.

TABLE 2.—MORTALITY AMONG FOWLS IN EXPERIMENT NO. 2.

House No.	Weeks Ending 5-8-20	5-15-20	5-22-20	5-31-20	6-8-20	6-15-20	6-23-20	Total
1	5	42	25	13	3	9	8	105
2	1	9	13	10	1	1		35
3*	14	15	39	25	3	2	8	106
4*	8	6	19	14			1	48
5	1	2	3	5	1		9	21
6*	9	28	39	29	2	3	2	112
7		2						2
8	1	1	2		2		4	10

* All fowls vaccinated May 20, 1920.

TABLE 3.—SUMMARY OF RESULTS OF EXPERIMENT NO. 2.

House No.	Number of Fowls	Treatment	Mortality for the 3 weeks ¹ prior to vaccination		Mortality for 3 weeks ² subsequent to vaccination	
			Number	Per cent	Number	Per cent
1	373	None	72	16.18	25	6.97
2	490	"	23	4.48	12	2.44
5	589	"	6	1.00	6	.98
7	632	"	2	.31		
8	408	"	4	.97	2	.49
Total..	2,492		107	4.11	45	1.80
3	438	Vaccinated	68	13.43	30	6.84
4	181	May 20, 1920	33	15.42	14	7.73
6	335	"	75	18.29	34	10.15
Total..	954		176	15.57	78	8.17

¹ Percentage based on number of fowl in flock on April 30, 1920.

² Percentage based on number of fowl in flock on May 20, 1920.

EXPERIMENT NO. 3

It was not until the following winter that an opportunity was afforded for the continuance of this work. Beach having reported his results during the summer, it was decided to employ the same vaccine that he recommended. Sufficient virus for this work was purchased from the University of California. The

vaccine was prepared from this virus and injected according to the method recommended by Beach.

The first flock in which this vaccine was used was in Delaware County, Pennsylvania. The disease had appeared on this farm in the winter of 1919-20. During the fall of 1920 a few cases developed, but the disease did not spread. The manager was able to control it by local treatment. The fact that these cases developed without a tendency to spread led us to question the diagnosis. Inoculation experiments were carried out and it was found that the disease could be readily transmitted. In November the fowl were housed and by the first of December the manager informed us that the disease was spreading rapidly and he was unable to control it. Arrangements were made to carry out an experiment in one of his houses. This house was divided into five pens. The two end pens, A and E, and one-half of the middle pen, C, were vaccinated December 7, 1920. Pens B and D and one-half of C were left as controls. No treatment other than the vaccine was attempted. On December 14 pen A was injected the second time.

Each fowl was leg banded, thoroughly examined, and a record made of its condition at the time of vaccination. They were all carefully examined on December 20 and again on January 3.

TABLE 4.—RESULTS OF EXPERIMENT NO. 3.

Description	Condition	Observation 12-7-20	Observation 12-20-20	Observation 1-3-21
Pen A,* vaccinated twice	Healthy.....	46	47	34
	Affected.....	32	29	40
Pen B, controls	Healthy.....	46	41	23
	Affected.....	34	39	51
Pen C,* vaccinated	Healthy.....	16	19	15
	Affected.....	19	12	19
Pen C, controls	Healthy.....	18	22	13
	Affected.....	19	12	19
Pen C, controls	Healthy.....	18	22	13
	Affected.....	19	15	24
Pen D, controls	Healthy.....	51	47	35
	Affected.....	25	29	39
Pen E,* vaccinated	Healthy.....	52	52	32
	Affected.....	21	21	41
SUMMARY: Vaccinated	Healthy.....	114	118	81
	Affected.....	72	62	100
Controls	Healthy.....	115	110	71
	Affected.....	78	83	114

*Vaccinated 12-7-20.

Table 4 shows the condition of both the vaccinated birds and the controls on the above-mentioned dates.

It will be noted that the disease remained practically stationary for the first two weeks following vaccination. During the second two weeks it increased, as shown plainly in the summary of results. It would appear at first glance that the vaccinated fowl showed some resistance, as on January 3 there were 81 healthy in the vaccinated lot against 71 healthy in the controls. A second glance, however, will show that there were more cases developed between December 20 and January 3 in the vaccinated lot than in the controls.

The mortality in this flock was relatively low and is of little value in determining the effects of the vaccine. The following is a record of all deaths from December 7, 1920, to June 1, 1921:

Vaccinated birds.....	Pens A, C and E, 21
Controls	Pens B, C and D, 32

These numbers include all deaths, many of which were due to intestinal disturbances. During the spring enteritis was quite prevalent in this flock and was the cause of death in many instances. The number of those which died showing lesions of chicken-pox was: Vaccinated birds, 11; controls, 7.

EXPERIMENT NO. 4

Experiment No. 4 was carried on at about the same time as No. 3 and on a farm situated in the same county. The data are given in Table 5, from which it will be seen that the infection appeared in two houses, Nos. 1 and 2, in which there were nine pens in all, and in six out pens.

The three columns give the conditions as found at the three different dates, it being understood that such pens as were vaccinated were vaccinated December 10, 1920.

It is to be observed that at the time of the first observation a certain number of birds, those vaccinated, and the controls, were both affected and healthy. At the time of the second observation there had been a marked improvement, the number of infected birds being markedly fewer. At the time of the third observation, conditions had grown worse, which may probably be credited to an intervening spell of bad weather.

At the time of the third observation the condition with regard to the controls was much as it had been originally, while there

TABLE 5.—RESULTS OBTAINED IN EXPERIMENT NO. 4.

Description	Condition	Observation 12-10-20	1st Observation 12-29-20	2nd Observation 1-12-21
HOUSE NO. 1:				
Pen A,* vaccinated	Healthy.....	35	61	61
	Affected.....	38	12	12
Pen B, controls	Healthy.....	36	47	42
	Affected.....	21	10	16
Pen C,* vaccinated	Healthy.....	29	40	36
	Affected.....	20	9	13
Pen D, controls	Healthy.....	18	35	39
	Affected.....	35	18	14
Pen E,* vaccinated	Healthy.....	28	43	34
	Affected.....	19	4	13
Pen F, controls	Healthy.....	29	40	29
	Affected.....	17	6	17
HOUSE NO. 2:				
Pen A,* vaccinated	Healthy.....	56	58	41
	Affected.....	7	5	22
Pen B, controls	Healthy.....	84	82	42
	Affected.....	5	7	47
Pen C,* vaccinated	Healthy.....	57	54	50
	Affected.....	6	9	13
OUT PENS:				
No. 1,* vaccinated	Healthy.....	10	20	21
	Affected.....	13	3	2
No. 2, controls	Healthy.....	10	14	17
	Affected.....	12	8	5
No. 3,* vaccinated	Healthy.....	14	16	17
	Affected.....	8	6	5
No. 4, controls	Affected.....	12	18	14
	Healthy.....	9	17	17
No. 5,* vaccinated	Healthy.....	15	7	7
	Affected.....	12	17	15
No. 6, controls	Healthy.....	9	4	6
	Affected.....			
SUMMARY:				
Vaccinated	Healthy.....	238	309	277
	Affected.....	126	55	87
Controls	Healthy.....	201	253	198
	Affected.....	107	55	110

* Vaccinated 12-10-20.

was an improvement with the vaccinated birds. It is somewhat questionable, however, if this was due to the vaccination. If so, it was not sufficient to be of practical value, as neither the egg production nor the mortality was favorably influenced. In this experiment but two birds died, one of which had been vaccinated and the other had not. These were not listed in the table. Egg production, recorded from December 9, 1920, to January 11, 1921, inclusive, was as follows:

Vaccinated fowl	8.38 eggs per hen
Controls	8.25 eggs per hen

DISCUSSION

These flocks were carefully selected as showing good typical lesions of chicken-pox, not complicated with lesions which might be confused with other diseases of chickens.

In each flock there were numerous cases of small wart-like epithelial tumors on the comb, wattles or skin of the head, and these lesions are accepted by most authorities as diagnostic of chicken-pox. In addition to these external lesions there were also many diphtheritic areas or caseous and cheesy areas in the mouth, on the tongue and in the throat. All birds were handled at the time of vaccination and at each examination to determine the general condition and marking, the degree of affection of the comb, wattles, face, mouth, tongue and throat.

In all the tables the birds marked affected showed either the small wart-like epithelial tumors known as external lesions or the diphtheritic or caseous areas on the tongue, in the mouth or in the throat. Those marked healthy are birds which were in good physical condition and showed no lesions of any kind.

In Experiments 1 and 2 the disease had been present for some time, and if all the birds had been treated it might have led us to think that they were benefited by the treatment. The disease entirely disappeared from each of the premises and up to the present time has not been found again. In Experiments 3 and 4 if all had been treated and no physical examinations made it might have seemed that the disease had been checked.

It is our hope to do more work along these lines, for up to the present time the results of our experiments, which were of fair magnitude and conducted in the field, do not confirm the results obtained by other investigators. In our hands the vaccine recommended and produced by Beach has apparently not been of practical value in controlling chicken-pox. It is of course possible that further studies will necessitate some modification of our conclusions, but since the whole matter is one of considerable importance, we felt that we were justified in presenting the results already obtained. We further hope that other investigators may be stimulated to carry on similar experiments, so that absolutely definite conclusions may be reached as to the value of this product.

The authors wish here to express their appreciation to Dr. George H. Hart, of the Veterinary School, University of Pennsylvania, for the valuable assistance given them in connection with Experiments Nos. 3 and 4.

LITERATURE

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ANIMAL EXPERIMENTATION, THE DOCTOR AND THE DOG

(From an article entitled "In the Time of Henry Jacob Bigelow," by William J. Mayo, M. D., Rochester, Minn., in *Journal of the American Medical Association*, August 20, 1921.)

JENNER on a certain occasion presented arguments which were capable of being proved, but which he had not proved. The following day John Hunter wrote to Jenner saying, "Why submit hypotheses? Try it on a hedgehog and know." Animal experimentation has resulted in gifts of inestimable value to humanity. The pernicious activities of antivivisectionists seriously threaten the continuance of these investigations, which are of such paramount importance to the nation's health. It is of interest to note that in the last election in California the antivivisectionists, aided by various organized cults, such as Christian Science, osteopathy and chiropractic, were defeated two to one by a referendum directly to the people, a triumph of an appeal to reason. The defeat of the antivivisectionists was owing in a great measure to the sagacity of Dr. Ray Lyman Wilbur, President of Leland Stanford University. The people, the farmers in particular, were shown what animal experimentation has accomplished in the prevention of disease to farm animals, what it has accomplished for the canning industry in relation to botulism, and the possible effect on economic conditions in California if the work should be discontinued.

It is undoubtedly true that much of the opposition to animal experimentation among reasonable persons has been brought about by a few careless physicians. For at least four thousand years the dog has been man's friend and companion, and the

occasional buying of stolen family pets at small prices for animal experimentation, as has been done in some laboratories, has alienated the public. The physician should not be a fence for stolen property, and his complicity can not be glossed over by saying that he did not know the property was stolen. The physician has no more right to a stolen dog than to a stolen purse. All these difficulties could be overcome by a proper law which would turn vagrant dogs over to accredited institutions. At the present time thousands of homeless dogs, many times more than the number used in all the laboratories of the United States, are killed at the pounds of the various cities, often by methods entailing more pain than any experiment carried out in a controlled laboratory, and are an economic loss except so far as their hides and fat can be used for commercial purposes. Some methods should be devised whereby these animals, or as many as necessary, may become legally available for the use of recognized, responsible laboratories for experimental work.

Moreover, the medical profession in the past has been derelict in permitting untrained men to perform animal experimentation without supervision. It was such experimentation that roused the resentment of a great many persons. If it is the wish of the medical profession to continue this work, its members must not furnish a market for the thief and they must protect the dog from the untrained experimenter. Fortunately, the organized physicians of the country have already made considerable progress in controlling the conditions of animal experimentation from within. Regulations which place upon laboratory directors responsibility for the importance of the problems studied and for the propriety of the procedures used in the solution of these problems have been formulated and adopted by corporate vote in medical institutions throughout the land. By pursuing the policy of honesty and faithfulness to a trust, animal experimentation can be carried on without serious objection. Experiments on animals were performed in Bigelow's time, but today such investigation has become one of the foundation stones of progress.

Dr. Emlen Wood has resigned from the position of Assistant State Veterinarian of South Carolina, and has started practice at Greenwich, Cumberland County, New Jersey.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

PYOSALPINGITIS AND THE SURGICAL TREATMENT THEREOF

By G. E. JORGENSEN

Ulermont, Iowa

Patient.—A four-year-old purebred Jersey cow.

History.—Had been bred and conceived when at the age of three years, the pregnancy terminating in parturition after a normal and uneventful duration. The birth, however, was quite pathological, presenting both a maternal and fetal dystokia as follows: There was present an anterior presentation in the dorso-pubic position with a lateral deviation of the head in the right ilio-cephalic position with both front feet engaged in the pelvis. Repulsion and version corrected this, and delivery of a live, well-developed calf followed. This calf developed acute enteritis and pneumonia within twenty-four hours in spite of the fact that it was not allowed to receive any nourishment and had been given several enemas to clean out the digestive tract and one dose of calf-scur serum. It died in two days. Cultures from the lungs and intestines showed two streptococci, one of the *viridans* group and the other a green-producing, hemolytic, long-chained variety.

The cow revealed extensive placentitis and metritis with retained placenta and considerable uterine discharge. No attempt was made to irrigate the uterus, but instead capsules containing zinc oxide and iodoform were placed deeply within its cavity every three days. In seven days the placenta was removed, and the uterus showed enough involution in four days thereafter so that it could be douché and the fluid siphoned out. After about four weeks' treatment the uterus and cervix were so nearly normal that the patient was discharged from treatment.

Three months after parturition I was called to see her again for the reason that she had shown no signs of estrum. Vagi-

nal examination revealed a normal cervix firmly contracted, with no signs of any inflammation or discharge. Rectal examination revealed a cystic corpus luteum in the left ovary. It is an established fact that cystic degeneration of the corpus luteum indicates an infection of the oviduct at time of rupture, which points to tubal infection on the side where present. Hence, for fear that rupture of the cyst at this time would further infect the adjacent tissues, treatment was confined to a careful dilatation of the cervix and irrigation of the uterus with normal salt solution. A small amount of flocculent muco-pus was siphoned out. Irrigations were carried out once a week for three weeks, at which time the writer was called away and was absent for three weeks. Upon his return the patient was examined and showed an extensive enlargement of the left tube with considerable adhesion of the pavilion to the ovary. The right ovary was normal, as was the tube as far as palpation could indicate. A diagnosis of pyosalpinx was made, and as the breeding efficiency of the animal was nil in the present condition, surgical interference was advised, cause for such action being based upon the radical treatment of pyosalpinx in women. The operation was carried out as follows:

The animal was given $11\frac{1}{2}$ ounces of chloral after being fasted for twenty-four hours. One hour after the administration of the chloral the animal was secured in the stocks in such a manner that it could not lie down, and an area twelve inches in diameter on the left side was shaved and cleansed in the usual surgical manner, after which an incision was made through the skin and underlying fascia down to the abdominis externus as far back as possible and about eight inches in length. Following this the external abdominis obliquus was divided in the direction of its fibers, while the internal was incised with the scalpel in the same direction as the external. The left tube and as much of the cornua as could be brought out were then exposed through the incision and the ovary and tube freed from the suspensory ligaments. Following this the tube was clamped off at its uterine termination and severed from its attachment thereto, after which the stump was cauterized with pure phenol and a purse-string suture inserted in the serous coat and the tip

or stump pushed in, similar to the technique employed in an appendectomy on the human. The parts were then returned and the laparotomy wound sutured. The case made an uneventful recovery and is now pregnant.

Discussion.—Pyosalpinx is in the majority of cases bilateral. In fact, out of some forty cases seen by the writer this is the first one which appeared to be unilateral. If bilateral, surgical intervention is of course contra-indicated. In such cases it is better to leave the tubes alone and concentrate the treatment on the cervix and uterus in the hope that the tubal infection may not prove so severe that occlusion occurs. The writer has found that a cystic degeneration of the corpus luteum serves as a fairly constant indication to tubal infection, and this is corroborated by other writers. In this particular case there was a spread of infection by contiguity from the uterus to the tubes, and while the cervix and uterus appeared to be freed from infection and inflammation, there however did exist a chronic salpingitis and to a lesser degree pyometra. The chronic salpingitis terminated, as it occasionally does, in a tubal abscess. Sections of the uterine end of this tube revealed a complete destruction of the epithelial elements and a replacement with connective tissue, resulting in a complete occlusion of the tube, which extended to within two inches of the tubal abscess. This abscess involved the pavilion, which was entirely adherent to the ovary, which was involved in the abscess.

In this particular case there is another feature of interest. There was in this herd a chain of evidence running back to the bull. The bull came from a herd where genital infection had been rampant, and was finally discarded himself for the reason that he suffered from a partial sterility which gradually became absolute. Examination of this bull showed several pathological features, as follows: There was present an oligospermia. There were spermatozoa that showed various imperfections such as absence of tails, absence of nuclear membranes or atrophic nuclei and lack of motility, together with the presence of streptococci in the semen. Clinically an enlargement of the seminal vesicles and atrophic degeneration of the left testicle could be demonstrated. Autopsy on this bull later showed a chronic semino-vesiculitis and an atrophic degeneration of the testicles. Later it was learned

that this bull had suffered from scours during calfhood. The cow herein described had been bred to this bull and the calf born in dystokia and later dying from septic enteritis and pneumonia was its progeny. Cultures from the amputated tube showed the presence of streptococci similar to the cultures obtained from the bull and the calf.

There are two principal outstanding features in this case which serve as a motive for the presentation of this case report. First, an infection which can be traced back to the sire and from him to an infected herd where he originated, and later progressing in the form of an unbroken chain to a future generation, demonstrating the part played by the male in the transmission of genital infections and the ultimate chaotic results following in the dam and offspring. Secondly, that tubal diseases can be successfully controlled when unilateral, although such surgical intervention is very difficult due to the general inaccessibility of the genitalia in cows through laparotomy.

OLEANDER POISONING IN A BEAR¹

By W. J. RATIGAN

New Orleans Zoological Park, New Orleans, La.

SUBJECT—Black bear (*Ursus luteolus*), male, three years of age.

The animal was observed to be ill in the early afternoon on April 14. My office was notified but I was unable to get to the Park until nearly evening.

The bear was in considerable distress. The symptoms presented indicated a severe gastro-enteritis. The animal had vomited several times before I reached its quarters, and while I was in attendance it changed positions frequently and gave, as bears do, every evidence of marked abdominal pain, *i. e.*, lying upon the back with the limbs extended, attempting to procure relief by grasping with the paws anything within reach, etc., etc.

It is known down here that the bark and leaves of the oleander are toxic to animals. I couldn't account for this animal's con-

¹ Presented at the fifty-eighth annual meeting of the American Veterinary Medical Association, Denver, Colo., September 5-9, 1921.

dition in any other way than to lay the blame upon its ingestion of some of the leaves of this tree. The bark seemed undisturbed. The tree was a dozen feet from the cage. The following day one of the employees of the Park said he had seen a colored nurse, to amuse a child, pluck some leaves and place them in reach of one of the bears.

The animal showed slight improvement until the following noon when it became worse and died that evening.

Upon autopsy the stomach was found to be empty, its wall was considerably thickened and the mucous membrane was a slate or purple color. These changes extended into the duodenum, where several blood clots were found, indicating the previous hemorrhagic inflammation.

The following may be found in Law's "Principles and Practice," vol. 2:

DOGBANE FAMILY

In Apocynaceæ must be named the *Neurium Oleander* (a common house plant in the North and a garden or wild plant in the South and West). *Thevetia* and *Apocynum Andresæmifolium* (spreading dogbane) are most deadly acrid poisons to all kinds of stock. In my experience a horse cropping a few leaves of an oleander died in a few hours with violent gastro-enteritis. The dogbane is less poisonous when dried in hay.

The Pasteur Institute at Paris produced during the period of the war about eight million doses of serum of various kinds, according to an interesting article reviewing the work of the Institute during the war, by Dr. A. Calmette, assistant director, in the *Revue d'Hygiène*. The American Army and the American Red Cross received 800,000 doses. At the time of the German offensive in March and April, 1918, the Institute was able to furnish 20,000 vials of antitetanic serum per day.

Sigma Xi, the honorary scientific fraternity, accepted Dr. Leonard W. Goss of the Veterinary Department, Ohio State University, as an initiate at its recent meeting. Membership is based upon accomplishment and promise in the field of science.

Dr. P. W. Loob, who has been engaged in Federal hog cholera work in Kansas for over a year, has recently been transferred to Iowa on the same class of activities.

ABSTRACTS

VACCINATION AGAINST STRANGLES. René Van Saceghem. Ann. Méd. Vét., vol. 66 (1921), p. 100.

After referring to the seriousness of the malignant epizootic form of strangles affecting horses at army remount depots, and after reviewing briefly the work of other investigators, Van Saceghem describes a method of vaccination which has been tried in a preliminary way with good results in the Belgian Army and which is being introduced on a large scale in that army.

The vaccine is made of a two-days' culture of the streptococcus of strangles on bouillon, heated to 56° C. for half an hour. The streptococcus employed is a culture isolated from pus from affected horses at the remount depot for which the vaccine is intended. Before being used the vaccine should be tested by making cultures to make sure that it contains no living organisms. The vaccination consists of three subcutaneous injections, the first of 5 c.c. and the others 10 c.c. each, eight days apart. The first injection always gives a greater local reaction than succeeding ones. The thermic reaction rarely exceeds one degree (Centigrade). Old horses show a much milder local and thermic reaction than young horses. This may be accounted for by a natural immunity of the older horses. Horses already affected with strangles, especially those convalescing, show no local reaction. The horses vaccinated by this method have not contracted the disease in the midst of heavy infection.

The vaccine not only possesses preventive immunizing powers, but is also curative. After injecting subcutaneously repeated doses of 10 c.c. into horses gravely affected with strangles a manifest therapeutic action has been observed. In all cases the vaccine influenced very favorably the course of the disease.

PARATYPHOID OF THE HONEY BEE. L. Bahr. Skandinavisk Veterinar-Tidsskrift, vol. 9 (1919), pp. 25-60.

In the digestive tract of bees affected with a severe intestinal diarrhea the author found a type of bacteria which he classified as belonging to the paratyphoid group of bacilli and to which he gave the name "*Bacillus typhosus alvei*." The disease manifested itself in producing in these animals slight paralytic

symptoms and diarrhea, which was exceedingly infectious. In a few days a considerable number of bees were affected, the mortality being about 50 per cent. The organism, with few exceptions, could be recovered in pure culture from the intestinal tract of infected bees, and it is said in some instances from the blood. The organism is characterized as rod-shaped and has a certain biological and morphological similarity to the typhoid bacillus, but it is not identical with that occurring in man. The disease can easily be transmitted to healthy bees by feeding them with pure cultures of the bacillus. In concluding his investigations, the author lays particular stress upon measures for the eradication of the disease, particularly in controlling the purchase and sale of hives and queen bees.

J. P. O'LEARY.

SEPTICEMIC INFECTION IN LAMBS CAUSED BY THE BACILLUS OF SWINE ERYSIPELAS. M. Christiansen. Maanedsskr. Dyr-læger, 31 (1919), No. 12, pp. 141-254. Abs. in Exp. Sta. Record, vol. 44 (1921), p. 583.

This is a report of post-mortem examination made of a lamb 38 hours old in a flock in which there had been a very high mortality among the lambs, revealing hemorrhagic enteritis, great enlargement of the mesenteric glands, degenerative changes in other organs and small hemorrhages under the endocardium and epicardium. Small bacilli present in pure culture were found to represent the swine erysipelas bacillus. It is stated that no case of swine erysipelas in pigs had occurred at the farm during the time of the outbreak among the lambs.

COMPLEMENT FIXATION IN BOVINE TUBERCULOSIS. C. Hruska and W. Pfenninger. Ann. Inst. Pasteur, vol. 35 (1921), p. 96. Abs. in Amer. Rev. Tuberc., vol. 5 (1921), p. 98.

The antigen of Besredka fixes alexin in the presence of serum of tuberculous cattle. In the sera of 304 known tuberculous cases, 84.5 per cent positive reactions were recorded. Of 90 sera where tuberculosis was not demonstrable at necropsy, 2.2 per cent reacted positively. Where tuberculosis was not advanced (glandular only) the percentage of positive reactions was 60 per cent. Where the involvement included lungs, pleura, peritoneum and some of the abdominal viscera, the reaction

was 85 to 95 per cent positive, and when the disease was generalized all sera reacted positively. The method should be an important diagnostic aid in bovine tuberculosis.

EXCRETION OF TUBERCLE BACILLI IN BILE. A. C. Marchisotti. *Semana Méd.*, vol. 28 (1921), p. 37. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 98.

Marchisotti found the liver often affected in tuberculous cattle. Healthy milk can thus become readily contaminated by droppings from tuberculous cattle, or the apparently healthy cow herself may be voiding tubercle bacilli by way of the stools. His research was done on cattle slaughtered for the market and thus supposedly healthy, the tuberculous lesions being a necropsy surprise. Human urine and stools are liable to transmit the tubercle bacilli as readily as sputum. Tuberculosis of the liver should be classed as open tuberculosis on this account. Tuberculin tests do not reveal the involvement of the liver in particular.

TUBERCULOSIS IN SMALL RODENTS. A. Boquet and L. Negre. *Ann. Inst. Pasteur*, vol. 35 (1921), p. 142. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 99.

The experiments recorded confirm the statements of previous authors such as A. Koch, Rabinowitsch, De Jong, Weber, Bofinger, Straus, Romer and A. S. and F. Griffith, that white rats and mice are susceptible to infection with tubercle bacilli, human, bovine and avian types, but are so resistant to small doses that they cannot replace the guinea pig or rabbit in experimental work. Intraperitoneal inoculation of 1 to 2 mgm. offers the surest means of producing infection, which is manifested chiefly by the formation of tubercles in the lungs, and by the intense multiplication of bacilli in the liver and spleen. Intracutaneous inoculation in the ball of the foot occasionally provokes extensive, severe lesions. Infection is favored in general by the introduction of repeated small doses. Only rarely is tuberculosis infection fatal to rats and mice. The three types are of about equal virulence. Inoculation of the bacillus of Arloing and bacilli of the piscine types does not cause infection. Infected animals are not very susceptible to tuberculin. The phenomenon of Koch is not observed.

DIAGNOSTIC VALUE OF TUBERCULIN IN HUMAN SURGICAL TUBERCULOSIS. C. Mau. *Deutsch. Ztschr. Chir.*, vol. 161 (1921), p. 145. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 110.

Ninety-nine patients were tested first with the Pirquet test and, if positive, with 1, 5 and 10 mgm. of O. T. subcutaneously. Conclusions: 1. A positive focal reaction is obtainable in only two-thirds of cases of surgical tuberculosis. Closed cases react more frequently than those with fistulae or abscesses. Occasionally a certain case of tuberculosis reacts focally but not constitutionally. Healed cases do no longer give a focal reaction. 2. A focal reaction which is only subjective must be accepted with great caution. 3. If all tuberculin tests are negative, tuberculosis can be excluded with certainty; if temperature and focal reactions are absent, but the puncture reaction is positive, tuberculosis can be excluded with great probability, or healing can be assumed to have taken place. 4. An absent focal but positive temperature reaction does not speak against tuberculosis. In these cases the onset and cause of the temperature may have a limited diagnostic value. 5. The tuberculin test, carried out systematically and cautiously, is a valuable and harmless diagnostic help.

THE FRIEDMANN TREATMENT OF TUBERCULOSIS. M. Nathan. *Presse Méd.*, vol. 28 (1920), p. 819. Abs. in *Amer. Rev. Tuberc.*, vol. 5 (1921), p. 104.

The chief characteristic of the method is the inoculation of living acid-fast bacilli, isolated from a turtle. They are differentiated from human tubercle bacilli (1) by growing at a temperature between 13° and 42° C., (2) by producing miliary tuberculosis in cold-blooded animals, and (3) by being harmless for warm-blooded animals. Friedmann would classify them as a separate species, intermediate between the human and reptilian bacilli. Pierkowski and others dispute this claim, saying that they are human bacilli, accidentally infecting the turtle and becoming transformed gradually in its new host. Calmette states that Friedmann's cultures contain human as well as turtle bacilli. Friedmann maintains that his bacillus, while innocuous for man, will immunize against human and bovine infection, and supports his claim by animal experiment, but in 1912 he was more conservative than in 1904. Orth and Ehrlich could not con-

firm Friedmann's claims. Selter in a recent work was unable to prove the existence of antibodies following inoculation with the Friedmann organism and could not alter the course of disease in guinea pigs infected with human organisms by treatment with turtle bacilli. Friedmann has inoculated infants and caused positive skin reactions which later disappeared, but Selter in duplicating this work obtained negative results. Clinically, the method has been tried in surgical cases with contradictory results and no definite conclusions can be drawn at present. With pulmonary tuberculosis the results are also inconclusive and accidents have been reported from the use of this method. Some successes have been obtained, whether due to the method or not is a question, and most results are negative or doubtful and cases as comparable as possible have given different results. The writer concludes that Friedmann's case is far from being proved and time alone will decide. All new methods have produced transitory successes.

EFFECTS OF FILTRATION ON THE POTENCIES OF ANTITOXINS. W. N. Berg. *Jour. Infect. Diseases*, vol. 29 (1921), pp. 86-90.

The author wished to ascertain whether any antitoxic units were adsorbed when a product, such as tetanus antitoxin, was filtered through a Berkefeld type filter.

In filtration experiments with diatomaceous earth, protein was adsorbed from tetanus and diphtheria antitoxic products in quantities ranging from 5 to 33 per cent of the original protein content.

In experiments with fuller's earth, the protein absorbed was 4 to 78 per cent.

The conclusion reached was that there will be a detectable adsorption of antitoxic units if there is protein adsorption in large amount (20 per cent or more), while if protein adsorption is less than 20 per cent, there may be no detectable adsorption of antitoxic units.

As ordinarily carried out, filtration of an immune serum through a Berkefeld type filter does not result in appreciable losses of antitoxic units.

ARMY VETERINARY SERVICE

EXAMINATION FOR APPOINTMENT IN VETERINARY CORPS

The Surgeon General recently announced that an examination has been authorized by the Secretary of War for appointments to the grade of second lieutenant in the Veterinary Corps of the Regular Army. Not to exceed 16 appointments will be made as the result of this examination. The date is not fixed, but the examination may be expected to occur during the next three or four months.

These examinations will be held by boards of officers convened in the various corps areas and applicants should apply to the commanding general of the corps area in which they reside for circulars of instruction, announcement of the date and all other information.

Before authority to take the examination can be given it is necessary for each candidate to file an application for commission in the Regular Army on Form No. 88 AGO. This form may be obtained at any military post or station or from the Adjutant General, U. S. Army, Washington, D. C.

The information given in the application must include names of veterinary colleges attended, date of graduation, and satisfactory evidence of the required one year's experience in the practice of veterinary medicine or its equivalent in hospital work, or as an instructor in an approved veterinary college, or as an employee of the Bureau of Animal Industry of the United States Department of Agriculture actively engaged in veterinary professional work, subsequent to graduation, and a complete statement of military service, if any. The application must be accompanied by evidence of citizenship, if the applicant is of foreign birth, and by certificates, based upon personal acquaintance, from at least three reputable persons as to citizenship, character and habits. When completed, the application should be forwarded through military channels to the commanding general of the corps area in case the applicant is in the military service. All others may submit their applications directly to the nearest corps area commander or to the commanding officer of any nearby military post, camp or station.

Another requirement is that the applicant shall be a member of the Veterinary Reserve Corps at the time of taking the

examination. Consequently *prospective candidates who are not now enrolled in the Veterinary Reserve Corps should apply without delay by letter to the Adjutant General, War Department, U. S. A., Washington, D. C., for a commission in the Veterinary Reserve Corps, stating in the application that they desire to be so commissioned for the purpose of taking the examination for appointment in the Veterinary Corps, Regular Army.*

No candidate will be permitted to take the examination who will not at the probable time of appointment be between the ages of twenty-one and thirty years. The earliest limit of probable time of appointment may safely be considered as December 1, 1921.

The examination follows the general requirements of AR 605-20. This publication is not available for general distribution and the extracts therefrom given below will be found of value to candidates.

The policy of the War Department to require a preliminary examination, a period of observation of four months at the Medical Department Service School, and a final or qualifying examination has been waived for this examination and the preliminary and final examinations will be combined into one.

To be eligible to take the examination a candidate must be a male citizen of the United States. He must have a satisfactory general education, must be a graduate of an acceptable veterinary college legally authorized to confer the degree of Doctor of Veterinary Medicine, or its equivalent, and which requires students to have covered satisfactorily a four-years high school course, or its academic equivalent, as a minimum entrance requirement, and which maintains this course of instruction covering a period of four years of not less than seven months in each year. The applicant must also have had, subsequent to graduation, at least one year's experience in the practice of veterinary medicine, or its equivalent in hospital work, or as an instructor in an approved veterinary college, or as an employee of the Bureau of Animal Industry of the United States Department of Agriculture, actively engaged in veterinary professional work.

Each candidate must present to the examining board a diploma conferring upon him the degree of Doctor of Veterinary

Medicine, or its equivalent, or a certificate of graduation, which will be returned to the candidate when it has served its purpose.

The physical examination conforms to the standards prescribed by the War Department for officers of the Regular Army. Candidates cannot be accepted subject to the performance of operations for the removal of physical defects. Candidates are also examined and investigated for moral character, adaptability and fitness for the service.

The mental examination will be written. The subjects covered and the relative weight of each follows: Anatomy, 12; physiology and histology, 10; materia medica and therapeutics, including toxicology, 8; pathology, bacteriology and parasitology, 8; meat and dairy hygiene, 11; practice of medicine, 12; obstetrics and zootechnics, 5; chemistry and physics, 4; surgery (general, operative, dental and of the foot), 12; veterinary preventive medicine, including animal sanitation and management, 12; and horseshoeing, including pathological shoeing, 6.

The Veterinary Corps of the army was reorganized in 1920 and now presents an attractive career to the young civilian veterinarian to whom army life appeals. Commissions are granted in the grade of second lieutenant with eligibility for promotion to first lieutenant after three years' service, captain after seven years, major after 14 years, lieutenant-colonel after 20 years and colonel after 26 years. Veterinary officers receive the pay and allowance of all other officers of corresponding grades.

A hound dog went mad at Massapeag on July 11, and bit Mrs. A. M. Etheridge in the thigh, a man named Rogers, in one of his hands, and also bit a cow. The dog died later. The wounds on the man and woman were cauterized and they will be pasteurized as soon as possible.—*Norwich (Conn.) Record*.

The following question and answer from an examination for nurses is reported by a Pittsburgh physician to the *Journal of the American Medical Association*:

Question—How is certified milk produced?

Answer—The cows are milked by people who are dressed in white, kept in clean stables and put in sterile containers, then kept in a cool place.

ASSOCIATION NEWS

MISSOURI VALLEY VETERINARY ASSOCIATION

THE twenty-eighth annual meeting of the Missouri Valley Veterinary Association was held at the Hotel Rome, Omaha, Nebraska, July 11, 12 and 13. The attendance was excellent and good interest in the program was displayed.

The program opened with an address of welcome by James Dahlmah, Mayor of Omaha, an old-time friend of our association, who extended to us the key to the city and offered his pardoning power in case any member was unfortunate enough to fall into trouble. Dr. J. S. Koen responded in a very fitting manner to this address.

The scientific program opened with a very complete series of reports by the Committee on Milk and Food Inspection, as follows: "Vitamines in Milk, with Special Reference to the Effects of Heat," R. F. Bourne, Fort Collins, Colo.; "The Milk Goat and Its Relation to Our Future Milk Supply," P. L. Cady, Arlington, Nebr.; "Organization of Food and Milk Inspection in Small Cities and Towns," G. H. Mydland, Horton, Kan.; "Feeding and Care of the Dairy Cow for Milk Production," W. H. Bailey, St. Joseph, Mo.; "Souring Bacteria in Milk, with Special Reference to the Aciduric Group," J. S. Barbee, Kansas City, Mo.

Among the notable features of these reports might be mentioned the lively interest manifested in vitamines as concerned with animal nutrition. Many interesting points were brought out in this connection, particularly along the line of paralysis in pigs and cattle, in which was included the so-called loin disease reported on by Dr. A. T. Kinsley, in a paper to be mentioned later.

The efficiency of the milk goat as a source of the family milk supply was well presented by Dr. P. L. Cady. He called attention to the fact that the goat, Polly Mae, produced twenty-nine times her weight in milk in 365 days, while Segis Prospeet, a Holstein cow, holding the world's record for milk production, failed by 10,470 pounds of producing twenty-nine times her own weight in milk. The freedom of goats from tuberculosis and their adaptability to use on small premises were also emphasized.

Dr. J. S. Barbee in his report introduced some interesting data on the use of new strains of milk bacteria in the treatment of intestinal disorders in man.

The report of the Committee on Surgery was exceedingly valuable. Dr. H. E. Bemis discussed two methods of wound treatment; the first by the use of Dakin's solution; the second known as Morison's method, in which a paste known as "Bipp" is used. This paste consists of iodoform 16 ounces, bismuth subnitrate 8 ounces, liquid paraffin 8 ounces, or a sufficient quantity to produce a paste of the desired consistency. In using this paste, the area surrounding the wound should be cleaned, shaved and disinfected—all portions of necrotic material or other foreign matter removed, and the wound surface carefully sponged. The paste is then rubbed into the surface of the wound, the excess removed, the wound sutured or bandaged and left alone for 10 to 14 days. Various types of wounds are treated in this way, and healing occurs in a very satisfactory manner.

Dr. Bemis also called attention to a new method of preparing Dakin's solution from two stable stock solutions. These solutions are made by diluting 135 c.c. of the B. P. liquor calcis chlorinate to 750 c.c. and the making of a saturated solution of boric acid. Two hundred and fifty c.c. of this second solution added to the first gives one liter of Dakin's solution, known under the trade name of Eusol.

Dr. W. G. Gregory reported on the treatment of fistula following strangulated umbilical hernia. Following proper restraint and preparation of the fluid, he removes scar tissue around the fistulous opening, but does not disturb intestinal adhesions. The opening is then closed with heavy braid silk and the animal kept in a clean place for from 10 to 15 days, the wound being dressed with a mild antiseptic solution and laxative food being provided. Dr. Gregory reports a successful outcome in eight cases treated by this method.

Dr. R. C. Moore in a verbal report called attention to the frequency of rheumatism, obscure lameness and similar disorders resulting from focal infections which are easily overlooked. He believes diseased uteri may be commonly responsible for affections of this kind.

Reports by the Committee on Therapeutics gave some interesting data on a number of preparations in common use. The

following reports were rendered: Nux Vomica, R. C. Foulk, Holton, Kan.; Arsenic, E. H. Kartrude, Jasper, Minn.; Echinacea, A. Kaderabek, Fort Dodge, Iowa; Lobelia, P. C. Molgard, Ruskin, Nebr.; Digitalis and Serums, F. C. Carter, Sedalia, Mo.

Dr. W. T. Spencer, chairman of the Committee on Sanitation, called attention to the developing field of sanitation as a science and the thoroughness with which such work is being done when unhampered by politics and financial considerations. He emphasized also the great importance of thorough clean-ups following the removal of tuberculous animals from herds, stating that in Nebraska one veterinarian gives his entire time to this work.

Reports by Drs. B. F. Davis, B. W. Conrad and J. H. McLeod described conditions in their respective States relative to communicable diseases. Dr. Davis reported only one outbreak of hog cholera in Wyoming during the past year. Scabies has existed in cattle, sheep and horses, but is under strict supervision and is being rapidly eliminated. Dr. McLeod reported the inauguration of municipal food inspection service in his home city, taking effect August 1.

Dr. W. E. Muldoon read a very complete paper on dog distemper from a clinical standpoint. He stated that the specific cause of the disease has not been determined, although it is present in the catarrhal secretions of the mucous membrane and in most instances is taken into the body through food and water. He considers that various organisms are present as contributing factors in its causation, and that biologic products prepared from them probably have some value as prophylactic agents. His paper is well worthy of careful study when it appears in the veterinary press.

Dr. W. S. Ferrand reported his experience with the stomach tube in treating indigestion in the horse. He finds it a most valuable means of dealing with such disorders, if properly used. He employs a comparatively small caliber single-flow tube.

Loin disease in cattle as studied in the coast region of Texas was the subject of a report by Dr. A. T. Kinsley. The condition is a typical lumbar paralysis and affects range cattle grazing on prairie land, but not on river bottoms or timber land, so far as has been observed. No specific cause has been found, but in many respects the disease suggests deficiencies in the diet. The absence of water soluble B was suggested, and the

treatment with foods containing this vitamine seems to promise good results.

One of the most scholarly and valuable papers, entitled "The Veterinary Practitioner," was read by Dr. David S. White. He called attention to many of the achievements of the veterinary profession and presented his vision of its future field, emphasizing the need for unity, rendering of real service and the adaptation of methods of new problems.

Dr. J. I. Gibson presented a report of the progress made in Illinois by the welfare movement inaugurated by the State Veterinary Medical Association, of which he is field secretary. He makes a plea for thorough organization in each State, in order that the profession may present a united front in matters which concern the profession as a whole.

Dr. J. H. Lynch in an address entitled "The Veterinarian and Citizen," very forcefully expressed his views relative to the part which the veterinarian should play in the life of his community.

Prof. H. R. Smith gave some very interesting statistics in the control of tuberculosis in animals and man, which was followed by the showing of a two-reel motion picture prepared by the B. A. I. for exhibition to the public in the interest of tuberculosis eradication. Dr. Smith stated that 30 per cent of persons dying between the ages of 15 and 60 years die of tuberculosis and that one-third of human tuberculosis acquired before the age of 5 years comes from milk. He also states that 95 to 98 per cent of tuberculosis in hogs comes from milk or carcasses of affected cattle. In 1908, 2 per cent of the hogs slaughtered in Government establishments were retained for tuberculosis, while in 1920 nearly 11 per cent were retained.

The work of tuberculosis eradication is progressing satisfactorily, however, many applications cannot receive immediate attention because of the lack of men and funds to begin the work.

Following this paper, Drs. Hall and Morris of Omaha placed on display specimens showing tuberculous lesions in a horse, which excited great interest.

The entertainment features of the program were complete and enjoyable. The wives of members were admirably entertained and the usual show at the Ak-Sar-Ben was provided for men. The performance was one of the best which has been

our privilege to see, and many members could relate interesting episodes in which they played a leading part if they could be induced to do so.

The following officers were elected for the ensuing year:

President—P. L. Cady, Arlington, Nebr.

Vice-President—J. W. McGinnis, Ord, Nebr.

Secretary-Treasurer—R. F. Bourne, Fort Collins, Colo.

Trustees—S. W. Alford, Lincoln, Nebr.; L. U. Shipley, Sheldon, Iowa; B. W. Conrad, Sabetha, Kan.; A. T. Kinsley, Kansas City, Mo.; J. S. Koen, Bloomington, Ill.

The winter meeting will be held in Kansas City during the last week of January.

R. F. BOURNE, *Secretary*.

KENTUCKY VETERINARY MEDICAL ASSOCIATION

At the meeting of the Kentucky Veterinary Medical Association, held in Danville, Ky., July 6, 7 and 8, the following resolutions were adopted:

“Resolved, That we, the members of the Kentucky Veterinary Medical Association, do hereby express our sincerest appreciation and thanks to the Chamber of Commerce, Elks Club and the citizens of Danville for the most cordial reception in Danville; to the State Livestock Sanitary Board and the U. S. Bureau of Animal Industry for the able and efficient manner of controlling disease and offering assistance to the practitioner; to Drs. E. S. Good, W. S. Anderson, W. W. Dimock, M. Scherigo of the University of Kentucky; Dr. E. L. Quitman of Chicago; Dr. L. B. Ernest of Washington, D. C., and Dr. C. W. Fisher of Danville for the enlightening and instructive papers read at this meeting.

“Be It Further Resolved, That the secretary be and he is hereby instructed to send to each of the above organizations and individuals a copy of these resolutions, and that a copy be spread upon the minutes of this meeting.”

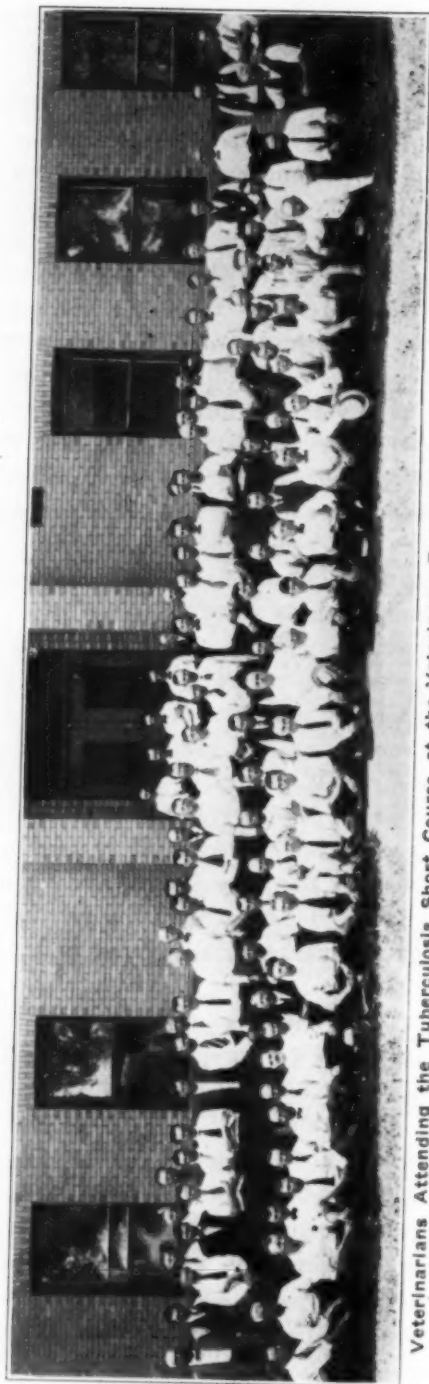
The meeting was a big success, over 100 members being present. Citizens of the town turned out to make us welcome. The Chamber of Commerce is made up of live members. The Farm Bureau entertained us with an auto ride in the country. Next meeting will be held at Owensboro, February 8-9, 1922. New officers will be elected at that time. Rising vote of thanks was given to Drs. E. L. Quitman and L. B. Ernest for interest shown us.

CHAS. W. FISHER, *Secretary*.

NORTH DAKOTA VETERINARY MEDICAL ASSOCIATION

On July 6 to 9 over 100 North Dakota veterinarians gathered at Fargo to attend a short course on tuberculosis. The course was presented by B. A. I. representatives, members of the North Dakota Livestock Sanitary Board and the faculty of the Veterinary Department of the Agricultural College. The work was carried out at the Veterinary Building of the college. Lectures and papers filled the forenoons while the afternoons were devoted to laboratory work and practical demonstrations of the various tuberculin tests, especially the intradermic test. A tuberculous herd of twenty-two animals was quartered in quarantine pens at the Veterinary Department and the technic of making the injections for the intradermic test and the making of observations were thoroughly worked out by each of the veterinarians present. Tuberculous swine and fowls were also available for the testing work. At the close of the course a number of the cattle, pigs and chickens were slaughtered and the technic of inspecting tuberculous animals was demonstrated by B. A. I. inspectors and the lesions carefully examined. Following the short course a Federal examination was given all men expecting to do accredited herd work and ninety veterinarians wrote papers. Dr. E. Lash of Washington, D. C., Dr. W. F. Crewe, North Dakota Livestock Sanitary Board, and Dr. A. F. Schalk, Inspector in Charge of North Dakota, Dr. C. H. Babcock, of the North Dakota Livestock Sanitary Board, and Dr. A. F. Schalk, Dean of the Veterinary Department of the Agricultural College, attended to the arrangements for the course and took prominent parts in its presentation.

Among the lectures delivered were the following: North Dakota laws, regulations and policies, W. F. Crewe; etiology, bacteriology and pathogenesis of tuberculosis, L. M. Roderick; the diagnosis of tuberculosis by the various tuberculin tests, C. H. Babcock; pathology and pathologic anatomy, L. M. Roderick; the preparation of tuberculins, R. E. Lubbehusen; Federal laws, regulations and policies concerning tuberculosis, H. H. Cohenour; relations between veterinarians and livestock owners, W. F. Crewe; tuberculosis in swine and poultry, A. F. Schalk; economic importance and clinical aspects of tuberculosis, R. S. Amadon; the relation of animal to human tuberculosis, Don Mc-



Veterinarians Attending the Tuberculosis Short Course at the Veterinary Department, North Dakota Agricultural College, Fargo, North Dakota, July 6-9, 1921.

Mahan; hygiene and sanitation in the control of animal tuberculosis, H. L. Foust; immunology in tuberculosis, A. F. Schalk; the significance of tuberculosis in meat inspection, C. Brady.

R. S. AMADON, *Secretary*.

WESTERN NEW YORK VETERINARY MEDICAL ASSOCIATION

The seventh semiannual meeting of the Western New York Veterinary Medical Association was held at Hamburg, N. Y., July 14. Dr. Edward Rafter had prepared a very interesting clinic consisting of cases for diagnosis and operation.

At 1.30 the association adjourned for lunch at Grange Hall, after which the business meeting was called to order by the President, Dr. F. E. McClelland.

Five new members were added to our number, which brings our membership nearly up to the seventy mark.

Dr. J. N. Frost of Cornell University gave a very interesting and instructive address on "Meningitis in Calves," which aroused considerable discussion.

A hatpin in the alimentary tract of a dog was the subject of a paper read by Dr. Chas. D. Blaser, Buffalo, N. Y. It also created considerable discussion and brought out reports of similar experiences among the other members.

The annual meeting will be held the second week in December at Buffalo.

F. F. FEHR, *Secretary*.

MONTANA VETERINARY MEDICAL ASSOCIATION

The Thirteenth Annual meeting of the Montana State Veterinary Association was held in Bozeman on July 29-30.

The association assembled at the Agricultural Building of the Montana State College. Prof. C. N. Arnett welcomed the association in behalf of the college and the City of Bozeman.

A clinical demonstration of Montana poisonous plants conducted by Prof. Swingle of the Montana State College, assisted by Drs. Marsh and Welch, featured the afternoon session.

In the evening the association met at the Three Bears Inn for its annual banquet. The horse problem in Montana was discussed by Prof. C. N. Arnett, representing the breeder's stand-

point; Dr. W. J. Butler, from an economical standpoint, and Dr. A. D. Knowles, from the standpoint of the veterinary practitioner.

On July 30, Dr. C. N. Arnett, assisted by Prof. Oscar Fretsven and Prof. Millin, gave a very interesting and instructive clinic on the principles of stock judging of beef cattle, horses, dairy cattle and sheep. This number was one of the outstanding features of the session.

Dr. Hadleigh Marsh gave a paper on the pathology of progressive pneumonia in sheep, assisted by a clinical demonstration of lesions by Dr. Howard Welch of Bozeman. Drs. Marsh and Welch have been doing considerable research work in this condition and much valuable information to the Montana practitioners is a result of their efforts.

Dr. B. T. Simms, of the Oregon State College, presented a clinical demonstration and discussion of sterility in cattle, assisted by Dr. Welch with a wealth of clinical material furnished by the Veterinary Department of the Montana State College. This interesting problem of the veterinarians was handled in a most thorough and painstaking manner by Dr. Simms and the association members can consider themselves extremely fortunate in having such an able demonstrator of this important economic condition of the livestock industry.

Professor W. F. Schoppe of the Montana State College concluded the program by a clinical demonstration and lecture on caaponizing.

Election of officers for the ensuing year resulted in the choice of Dr. C. H. Stevens of Stevensville, President; Dr. O. L. Devore of Bozeman, Vice-President; Dr. Hadleigh Marsh of Helena, Secretary-Treasurer.

The meeting adjourned to meet in Billings in 1922.

N. GUNN, *Secretary*.

MARYLAND STATE VETERINARY MEDICAL ASSOCIATION

Through the energetic cooperation of the officers and members of the Maryland State Veterinary Medical Association, together with the officers of the Pennsylvania and West Virginia Veterinary Medical Associations, an interesting and enjoyable meeting took place at Mountain Lake Park, August 9 and 10.

There were present about fifty veterinarians from the three States. The program was largely surgical and the patients were furnished for the most part through the untiring efforts of our "human dynamo" member, Dr. George E. Melody, of Oakland, and most of the clinical demonstrations took place on his four-thousand acre farm, just below Deer Park.

The meeting was opened with an address by the President of the Maryland Association, Dr. R. F. Smith, of Frederick. He urged the importance of hearty cooperation upon all members in furthering the interests of the profession, in an endeavor to raise our standard throughout the State, and requested all present to assist him in obtaining for membership every graduate veterinarian in the State.

The clinical program was opened with demonstrations of the standing and the recumbent castrations, by Drs. Melody and Smith, respectively. Much interesting discussion arose as to the merits of each method. However, as the two operations were performed perfectly, the discussion is likely to continue indefinitely.

The next clinical case presented was an umbilical hernia in a hog, complicated by an intestinal fistula through the hernial sac. Radical treatment was decided upon and Dr. R. F. Smith was requested to operate. About eight inches of intestine were found necrosed and were excised and end to end entero-anastomosis of the small intestine was necessary. Although under ether for an hour and a half, the hog manifested immediate appetite upon returning to consciousness. Shortly thereafter, without any by-your-leave, and without waiting to call a taxi, the hog started for home and was not again located until the following forenoon, at which time he was quietly eating and seemed in fine spirit. Inasmuch as the owner promised Dr. Smith a ham, should the animal live, all present wished the hog well.

Two cases of lameness and a peculiar case of actinomycosis followed.

We then adjourned for lunch, which was provided at the top of the mountain on the estate, at an elevation of 3,500 feet. The comedy of the meeting was here supplied by Dr. Bryan, who endeavored to thrust an eight inch leg, properly clothed in pressed trousers, through a six inch opening in a barbed wire

fence. The fence was victorious and kind friends offered help in the shape of paint, lantern soot and other similar camouflages.

After lunch we enjoyed an address by Dr. T. E. Munce, State Veterinarian of Pennsylvania. He dealt mainly with the progress of the veterinary profession and its importance to the livestock industry of the country. The annual losses from preventable infectious diseases were graphically illustrated by figures.

Dr. Munce was followed by Dr. J. A. Kiernan, chief of the Division of Tuberculosis Eradication, Bureau of Animal Industry. In a brilliant address Dr. Kiernan reviewed the work and accomplishments of the veterinary profession of America, with special reference to the eradication of animal scourges. He described how contagious pleuro-pneumonia still rages in some parts of Europe and would be still prevalent in this country but for the united efforts of the veterinary profession. His statement that the Kingdom of Holland spent twenty million dollars last year in a more or less unsuccessful effort to "control" foot and mouth disease and that Spain had appropriated twenty-five million for the same purpose, surprised his audience. This justified his conclusion that although the American veterinary profession has been severely criticized for its ruthless slaughter of affected animals, nevertheless foot and mouth disease had been completely eradicated from our borders at a much less cost than either of the countries previously mentioned spent in efforts to merely prevent its further spread.

The remarkable results of the efforts of the Bureau of Animal Industry to rid the South of Texas fever were next ably described. It was shown that only a small percentage of the originally affected area remained to be cleaned.

Dr. Kiernan concluded his remarks by a discussion of the all important subject of tuberculosis eradication. Perhaps the most surprising statement was that "at least 50 per cent of all the milk consumed in the United States was not pasteurized." Another statement of interest to all was that three-quarters of our States had shown a relatively small percentage of reactors among the cattle tested by the Bureau and that it would, therefore, be a relatively easy matter to eradicate the disease from these areas in a short time. Although the remaining 25 per cent of the area of our country was rather badly infected, neverthe-

less tuberculosis could be and will be eradicated from all areas in the United States in time.

Later in the afternoon clinics were again opened with a case of immense ventral hernia in a cow. The case was deemed inoperable and Dr. Melody performed the flank operation for ovariectomy and Dr. R. C. Reed, Chief, Division of Animal Industry, Maryland State Board of Agriculture, spoke for a time of the manipulation of the ovary direct and through the rectal walls.

In the evening all members attended the moving pictures at the Auditorium, where, in addition to several thrilling reels, we had exhibited the Bureau of Animal Industry film: "Out of the Shadows," a tuberculosis picture in story form.

On Wednesday we again met at Dr. Melody's farm. A post-mortem was held on the cow with the large ventral hernia, demonstrating the hernial ring and the content of the sac. Dr. T. A. Ladson, inspector in charge of tuberculosis eradication for Maryland, and Dr. John J. Muller, of the State force, then completed the postmortem by demonstrating the lymph glands usually affected by tuberculosis.

The great treat of the meeting came when Dr. John W. Adams, Professor of Surgery, University of Pennsylvania, demonstrated the operation for roaring, with correct methods for anesthesia. The years seem to treat Dr. Adams most kindly and he simply excelled himself, more than which could not be said of any member of our profession.

Dr. Ladson, assisted by Dr. E. B. Symonds and Dr. W. G. Benner, also of the Maryland office of tuberculosis eradication, demonstrated the intradermic tuberculin test. Drs. W. E. Langford and W. M. Stanley, of West Virginia, and Dr. L. B. Ernest, of Washington, D. C., led the discussion of the operative technique and interpretation of results of this test.

In the afternoon the association held its regular semi-annual business meeting. The minutes of the previous meeting were read and approved, following which Dr. G. A. Grapp, of the Maryland State Board of Agriculture, led the discussion regarding a more comprehensive and closely drawn act to regulate the practice of veterinary medicine in Maryland.

The meeting closed with a rising vote of thanks to Dr. G. A. Melody for his efforts to make the meeting a complete success,

and to Dr. Adams for his courtesy in extending to us the pleasure of his company.

A. H. BRYAN (*through HULBERT YOUNG, Secretary*).

ONTARIO VETERINARY ASSOCIATION

The forty-second annual meeting was held at the Ontario Veterinary College on August 11 and 12. Over one hundred veterinarians from different parts of the province were present.

The meeting convened with the president, Dr. J. A. Campbell, presiding.

Business matters, election of officers, etc., occupied the whole of the first morning, and addresses, papers and discussions were on the program for the afternoon and evening. "Standardization of Veterinary Fees," by Capt. J. Dunn of Barrie, Ont., brought forth much discussion, and a schedule of fees for members of this association has been presented to the executive committee for consideration. It is hoped that by adopting this schedule greater cooperation will exist among the practitioners in the province. Dr. A. B. Wickware of the Biological Laboratories, Ottawa, gave an illustrated address on "Diseases of Poultry." He emphasized the economic importance of poultry to Canada and urged veterinarians to pay more attention to this phase of livestock breeding. He stated that the fowls in Canada were worth \$200,000,000, and it was therefore essential to conserve this great industry by safeguarding the flocks from the ravages of disease. The diseases of chicks were dealt with, and tuberculosis, blackhead, etc., were also briefly mentioned.

At the end of the afternoon session, an excellent lunch was served in the assembly hall and great credit is due Drs. Otte-
well and Gwatkin for preparing such a satisfying meal.

The first address in the evening was delivered by Dr. C. D. McGilvray, principal of the Ontario Veterinary College. He spoke on the Andrew Smith Memorial Fund and stated that during the past year the sum of \$134.55 had been realized for this fund. He appealed to the members for further subscriptions, and Dr. C. H. Higgins of the Lederle Antitoxin Laboratories, New York, also made a strong appeal, with the result that \$143.85 was collected at the meeting and \$9 more pledged.

Dr. F. Torrance, Veterinary Director General, addressed the meeting on "Tuberculosis and the Accredited Herd Plan." He

outlined the fight in progress against tuberculosis which is being made by his department, and drew attention to the number of municipalities availing themselves of government inspection of cows. The number of cows tested under this system for the first four and a quarter months of the present fiscal year greatly exceeds the number tested during the whole of the preceding year. The accredited herd plan is also making great progress. The number of accredited herds in Canada is now 22, and 541 are under process of accreditation.

Dr. Robert Barnes, Chief Inspector, Meat and Canned Foods Act, gave a very interesting paper on "The Inspection of Canned Foods." He pointed out that no profession was so well qualified to inspect the raw material (which, of course, constitutes the principal part of the inspection) as were veterinarians. The numerous difficulties that had been encountered by his department were being overcome, and the inspection was being carried on efficiently and to the entire satisfaction of the canners. This paper brought forth some interesting discussion and the questions which were asked were promptly answered by Dr. Barnes.

Dr. C. H. Higgins next gave an interesting talk on "Service." Dr. Higgins is one of the most popular members of the association, and in his address made many timely remarks that were well received.

Both Drs. McGilvray and Higgins spoke on the *Canadian Veterinary Record*, and pointed out that the united efforts of Canadian veterinarians were necessary in order that the journal might continue to be published. They remarked on the good work being done by Colonel Evans (the editor), Dr. Gwatkin, Dr. Fowler and others. At this meeting 25 more subscriptions to the journal were made.

The meeting on the second day opened with demonstrations in the application of the tuberculin tests by Dr. McGilvray. He thoroughly explained the technique of all the tests and showed reactions in cattle that had been injected previous to the meeting.

Dr. J. F. De Vine of New York next gave an instructive talk on sterility. He stated that the methods employed on this continent were far ahead of those in any other country. The corpus luteum was fully described and its significance explained. Diagnosis of pregnancy was thoroughly outlined from a few weeks after conception up to parturition. Uteri of cows, both virgin

and in various stages of pregnancy, were supplied by Drs. D. A. Irvine and C. W. McIntosh, enabling Dr. De Vine to fully illustrate his methods. Dr. De Vine also demonstrated the treatment of sterility in several cows sent in for that purpose.

Equine surgery was performed by Dr. W. J. R. Fowler of Toronto, and Dr. D. R. Caley of Bracebridge performed cryptorchidectomy and reduced a hernia in a large pig.

Drs. R. A. McIntosh of Oakville and H. E. Batt of Toronto acted as assistants during the clinics.

The officers elected for the ensuing year are: Dr. J. A. Campbell, Toronto, president; Dr. D. R. Caley, Bracebridge, first vice-president; Dr. T. B. Buckley, Toronto, second vice-president; Dr. H. E. Batt, Toronto, Dr. J. Dunn, Barrie, Dr. D. A. Irvine, Toronto, and Dr. W. A. Thompson, Washago, executive committee; Dr. J. S. Glover, Toronto, secretary-treasurer and registrar.

J. S. GLOVER, *Secretary*.

An American writer in Denmark tells of an interview with "Dr. Bang, who has led the fight against bovine tuberculosis for 30 years. Dr. Bang was intensely interested in the progress of tuberculosis control in America and said that he believed our system of accrediting herds would accomplish good results."—*Hoard's Dairyman*.

Sixty-four species of mosquitoes have been discovered so far in Costa Rica, according to a list recently presented before the French Academy of Sciences.

Deseret News says of Federal meat inspection: "This is one of the reforms that has made progress swiftly and the thoroughness with which it is carried out is at once admirable and marvelous."

Dr. W. A. Scott, of Akron, Ohio, has assumed charge of the dairy and food division of the city department of health of Canton, Ohio. Dr. Scott has been engaged in this same kind of work, in the city health department at Akron. He succeeds the late Dr. Charles Ray, who died recently.

COMMUNICATION

"PROTECTING THE STOCK"

To the Editor:

We are inclosing a copy of an editorial which appeared in the *Harrisburg Telegraph* of June 27, 1921, under the title above quoted, as follows:

"The whole State will wish well to the campaign launched under the auspices of the State Bureau of Animal Industry and backed up by federal authorities and the veterinarians of the State for the reduction of tuberculosis, cholera, parasitic and other diseases which have been killing the livestock on Pennsylvania farms through lack of systematic effort. During the war people woke up, perforce, to the great importance of safeguarding the health of the horse and cow, the pigs and sheep and the chickens, too, and, thanks to the emergency, restrictions and inspections could be undertaken, which it is planned to supplement.

"The mere statement of the loss occasioned every twelve months to stock in Pennsylvania by controllable diseases should be enough to make everyone join in this movement to clean up the herds and the flocks and protect not only the investment of the farmers and many townspeople but our health as well because we all use milk and meat."

As this editorial brings out, the work to be successful must include the combined interest and cooperation of every agency that has to do with livestock. In this connection there is no more important agency than the practicing veterinarian. The practitioner becomes intimately acquainted with the livestock owners and is familiar with their problems. By continuing to do missionary work among the livestock owners of the State the Bureau of Animal Industry will be materially assisted in its work of preventing and repressing animal diseases.

By reason of the work the practitioner has done in keeping us informed of conditions in his district we have come to look upon him as a local representative of our Bureau.

In addition to the assistance rendered in preventing and repressing other wasteful diseases of animals and poultry, he has also been supporting the Accredited Herd Plan for repressing tuberculosis, and we are sure his efforts along this line are equally appreciated by the Federal authorities.

We are proud of the fact that the cordial relations, the cooperation and support that exist between the private practitioners of Pennsylvania and the Bureaus are not surpassed, if indeed equalled, by any other State in the Union. This is exactly as it should be.

We trust the practitioner will continue to keep us in touch with affairs in his locality, and we stand ready at all times to assist him as far as lies within our power.

The Bureau may formulate plans for carrying out measures pertaining to livestock problems, but without the cooperation and support of the practicing veterinarian our labor will be in vain.

We are counting on his continued support and cooperation in the drive to reduce losses from preventable animal diseases.

T. E. MUNCE, *State Veterinarian.*

One thousand buffaloes in the National Park at Wainwright (Alberta, Canada) will be slaughtered this year, according to Government plans. The park contains 5,000 at present. Those picked for slaughter will be mostly bulls. They will be sold in the markets of Canada and the United States.—*Wichita Daily Stockman.*

Dr. W. T. Spencer has resigned his position as State Veterinarian of Nebraska to become livestock commissioner in connection with the Omaha Livestock Exchange. Other important exchanges will shortly be organized with livestock commissioners, in order to assist in the tuberculosis eradication campaign in their communities.

Dr. J. T. Ellis, formerly of the hog cholera control force of the Bureau of Animal Industry in Tennessee, is now assigned to the same class of work in Iowa.

Dr. A. J. Wahn has recently disposed of his practice in Fosters, Ohio, and has again become affiliated with work of the Bureau of Animal Industry in South Carolina.

NECROLOGY

Dr. G. Frank Harker, one of the most prominent veterinarians of New Jersey, died September 3, 1921, and was buried from his late residence, 566 Perry Street, Trenton, N. J., September 6.

Dr. Harker was a graduate of the University of Pennsylvania, class of 1889, and had practiced his profession in Trenton since graduation. He was City Veterinarian and Chief Food Inspector of the Board of Health of Trenton since 1906. He was honored by the veterinary profession in his State in being elected President of the New Jersey Veterinary Medical Association. He was prominent in Masonic circles, belonging to Ashlar Lodge No. 76, F. and A. M., Trenton; Consistory S. P. R. S., 32d degree Scottish Rite; Crescent Temple, A. A. O. N. of the Mystic Shrine. He also belonged to Meni Lodge No. 217, I. O. O. F.

Dr. Harker was a victim of one of the most violent endemics of typhoid fever of which there is record. He attended a harvest home supper held at Jacobstown, N. J., on July 27. Chicken salad was served, and as a result of infection 200 cases of typhoid have developed in 116 homes in 23 municipalities, resulting in 26 deaths up to September 5.

The funeral was very largely attended. Many beautiful floral pieces attested his many friends. The following veterinarians were among those present at the funeral: J. H. McNeil, W. G. Middleton, James Mosedale, R. E. Mosedale, R. W. Carter, J. M. Herron, R. Brown, C. Beechwood, J. M. Delaney, J. H. Carter, H. H. Bair, L. P. Hurley, Henry W. Turner, New Hope, Pa., and John P. Turner, Washington, D. C.

Dr. Harker will be greatly missed by his friends and professional associates, as he was a man of the highest personal integrity and of a quiet, lovable disposition. He leaves a widow, two sons, and one daughter.

Dr. F. E. Barnes, of Waxahachie, Texas, who recently was bitten by a rabid dog which he was treating professionally, has gone to Austin for treatment in the Pasteur Institute.

MISCELLANEOUS

INTERNATIONAL CONFERENCE ON EPIZOOTIC DISEASES OF DOMESTIC ANIMALS

AT THE International Conference on Epizootic Diseases of Domestic Animals, held in Paris in May, 1921, the following conclusions and recommendations were adopted:

RINDERPEST

The Conference finds:

1. That in view of the uncertainty of our knowledge with regard to the resistance of receptive animals and of the variations due to the species, race or individual circumstances, the introduction of ruminants and hogs from regions that are not absolutely free from rinderpest constitutes a danger that justifies prohibitive measures.

2. That there is reason to continue experimental investigations with regard to mode of contagion, receptivity of the different animals, virulence of the various animal products, dangers that may result from conveyance of the virus by animals apparently cured or healthy, and, in general, everything relating to the experimental study of rinderpest.

Supplementary Recommendations

The Conference recommends that the fight against rinderpest be based on the following fundamental rules:

1. Immediate information, by telegraph to neighboring countries, of the new sources of infection that may be found in regions previously free.

2. In principle, compulsory slaughter of diseased animals and of those clinically suspected, also, as far as possible, of exposed animals, even if apparently healthy, with ample and immediate indemnity.

3. To prohibit the use of a live virus for the purpose of immunization in places that are free from the disease.

4. To prohibit the industrial or commercial manufacture of serums and vaccines against rinderpest, in districts free from the disease, with the exception of scientific institutions or those controlled by the state.

FOOT-AND-MOUTH DISEASE

The Conference finds:

1. That there is reason to continue actively the investigations relative to the study of foot-and-mouth disease, principally for the purpose of discovering scientific methods of treatment and a process for the practical immunization of the exposed animals.

2. That it is desirable that, without in any manner affecting the independence of investigators, connections be established among the several laboratories specializing in the study of foot-and-mouth disease, and that the results obtained, both in the laboratories and on the field, including negative or partial results, be immediately communicated and centralized.

DOURINE

The Conference finds:

1. That strict and continued vigilance should be organized in all countries where sources of infection of this disease should at any time be discovered.

2. That investigations relative to the treatment, practical methods of diagnosis of dourine, and persistence of the virus in animals apparently cured, should be continued, and reports immediately made of the results obtained.

Supplementary Recommendations

The Conference recommends:

1. That in districts menaced by the disease the stallions be registered and submitted to a monthly sanitary inspection.

2. That in those districts all mares already served or ready to be brought to the stallion be registered and also be subject to a monthly sanitary inspection.

SANITARY INFORMATION AND BULLETINS

The Conference finds:

1. That sanitary information should be telegraphed to all countries represented at the Conference when rinderpest appears in a region previously free from it, and also when the first cases of foot-and-mouth disease are noticed in a country previously free.

2. That printed periodical bulletins should be published following a uniform plan and furnishing information with regard

to the existence and extent of the following diseases: Rinderpest, foot-and-mouth disease, contagious pneumonia, anthrax, sheep pox, rabies, glanders, dourine, hog cholera.

3. That such information should include, for each province or State invaded:

(a) The number of counties and farms still infected at the beginning of the period reported;

(b) The number of counties and farms infected during the period reported, and, if possible, the number, classified by species, of the animals that are found sick or exposed.

4. That the bulletins should be published on the 1st and 15th of each month, and that they should be distributed, at the latest, ten days after the date of their publication, so they will reach the interested governments without delay.

EXPORT SANITARY MEASURES

The Conference believes that animals and dangerous animal products, when exported from one country to another, should be accompanied by a "certificate of origin and health" issued under the responsibility of the exporting country, by a government veterinarian or one approved by the government.

The wording of the certificate should be studied by each country, and the different texts or wordings should be examined in a future conference, with a view to arriving at the appropriate form, which should be submitted to the approval of the delegates of the countries represented.

INTERNATIONAL BUREAU

The Conference expresses the wish that an international bureau be created in Paris for the campaign against infectious animal diseases. It should have for its essential purpose:

(a) To collect and bring to the notice of the governments and their sanitary departments the facts and literature of general interest regarding the progress or condition of epizootic diseases, and the means employed to fight them.

(b) To promote and coordinate all investigations or experiments relative to the pathology or prophylaxis of all infectious animal diseases, wherever there may be occasion to resort to international cooperation.

(c) To study international plans and agreements relative to

the sanitary inspection of animals, and to place at the disposal of the governments signing these agreements the means of controlling their execution.

The office should be placed under the authority of a committee composed of the technical delegates of the several countries. This committee should meet periodically at least once a year. With the approval of the governments signatory to the Rome Convention of December 9, 1907, said bureau should be attached to the International Bureau of Public Hygiene.

The Conference desires that the French Government prepare a draft of a convention embracing the resolutions adopted by the Conference, submit it to all countries represented at the Conference, and invite the interested governments to appoint representatives to sign such convention at the earliest possible date.

The Conference appoints Messrs. Lutrario, Pottevin and Leclainche to get in touch with the proper French authorities and place themselves at their disposal for the purpose of helping them in the preparation of this draft of convention.

NOTES ON RINDERPEST

Rinderpest, which was believed relegated to the Asiatic and African continents, has reappeared in these latter times in Europe and has reached South America. In August, 1920, rinderpest was discovered in Belgium, imported through the simple passage in transit at Antwerp of Indian zebras destined to Brazil. In March, 1921, it is found in Brazil, and it is probable that it was brought there by the same animals. Russia in Europe has been infected largely during these last years by livestock from Asia. The disease was introduced in Poland following the invasion of Russian armies and the exodus of population provoked by it.

International sanitary conferences were held at Vienna in 1920 and at Kovno on February 23 and 24, 1921.

The rinderpest invasion of Russia in Europe and its spread to regions invaded by the Bolshevik armies could be foreseen as an inevitable consequence of the disorganization of administrative services and particularly of the sanitary police. On the other hand, the introduction of the contagion by the commercial route seemed unlikely. It demonstrates the necessity of a more

complete study of epizootic diseases and of possible ways for their transmission.

Notes taken during the Belgian epizootic bring very reassuring new views on the ways in which the contagion is spread. It is established that indirect transmission is very exceptional and that in a country possessing a good sanitary organization the spread of rinderpest is easily stopped by appropriate sanitary measures. On the other hand, rinderpest spreads rapidly, especially through the movement of exposed animals in countries which do not possess both an organized veterinary service and an administrative organization enabling rigorous application of prophylactic measures.

Prophylaxis of rinderpest is rendered difficult and uncertain by our lack of knowledge on a number of questions.

Studies carried on in Brussels by the French Mission have established a few points. They have brought the proof that swine may contract rinderpest under forms that render them very dangerous from the viewpoint of contagion. These animals were previously considered refractory and various regulations in force seldom take them into consideration.

It seems that contagion by animal products is little to be feared, the virus being rapidly destroyed in most mediums. However, it is indispensable that conditions of sterilization be determined exactly before giving up the very severe measures of protection heretofore applied. The realization of these researches present for commerce a considerable immediate interest.

Also, the danger resulting from the introduction of live animals will have to be established by new observations. The resistance of certain species allows the movement of exposed shipments to great distances. It is possible also for cured animals to remain dangerous for an undetermined time.

Finally, the use of various processes of immunization, serotherapy and sero-vaccination, will have to be studied anew.

It would be very desirable that missions which various governments have placed at the disposal of Poland be able to gather data and complete experiments according to a plan established by the Conference.

Rinderpest in Brazil

Rinderpest has appeared recently in Brazil, in the State of Sao Paulo,

The origin of the disease has not been clearly established;

however, the importation of Indian zebus, which infected Belgium, has been incriminated, and this hypothesis is by far the most likely among those that have been presented.

It appears from information dated April 13, 1921, that rinderpest has caused the greatest ravages in the State of Sao Paulo and that it has reached the neighboring States of Minas and Rio.

"The epidemic is developing with a fearful rapidity," says a report. "The spreading agents would seem to be other animals and more especially stray dogs and above all 'urubus.' Urubus are birds of prey of the vulture species. In cities they are found in proximity to abattoirs and feed on trimmings from carcasses. In stock-raising regions they are always found around herds. They alight on the animals and tear the skin to eat certain parasites. Covering rapidly great distances, these birds are terrible spreading agents of epizootics. Up to this time urubus have owed their survival to the belief held in the country in their role of scavengers. But rinderpest is about to give them a fatal stroke, for now everywhere the necessity of their destruction is proclaimed to prevent the spread of epizootics.

"The Government of the State of Sao Paulo has taken, from the beginning, energetic measures to limit the epizootic. The neighboring States and the Federal Government also adopt strict measures to prevent rinderpest from attacking herds previously free."

Instructions have been prepared by the Direction of Stock-Raising Service at Sao Paulo and sent to all proprietors.

It seems that Brazil unfortunately lacks veterinarians to assure the execution of prescribed measures.

Rinderpest in Poland

Rinderpest was introduced into Poland in July and August, 1920, by Bolshevik troops followed by infected herds. It spread during the occupation of eastern territories and during the weeks that followed between the retreat of the invaders and the installation of Polish authority. The palatinates of Bialystok, Lublin, Warsaw, and two districts of eastern Galicia were reached.

In September partial demobilization of veterinarians permitted the beginning of sanitary action, and a credit of one billion marks was granted. A commissioner-in-chief was appointed with

wide powers, and three sanitary zones were instituted. A first mobile zone called "military zone" is situated at the limit of the invaded territories; a second zone called "of high command" is established on the actual political frontier; a third zone called "Ministry of Foreign Affairs Zone" isolates the eastern provinces, in which intervention must be abandoned temporarily to military authority because of lack of personnel.

A laboratory has been established at Pulawy for the preparation of anti-rinderpest serum, with 300 cattle, and a second laboratory has been established at Brest-Litovsk with 100 cattle.

In November the personnel was reinforced by the students of the veterinary colleges and of the superior schools of agriculture. Numbers of new centers of infection were discovered.

Rinderpest was introduced as far as Pomerania, in the district of Blonsk, by military formations, which, despite prohibition, have brought exposed livestock back from the front. This center of infection was rapidly cleaned up.

The following figures give a résumé of the progress of the disease:

RINDERPEST IN POLAND

Period	Infected Localities	Infected Premises	Affected Cattle	Died	Slaughtered	Recovered
November 1, 1920	135	1,572	3,815	1,831	1,549	419
November 1 to 30	146	2,091	2,141	958	1,206	163
January 1 to 31, 1921	107	886	212	35	171	50
February 1 to 28	74	1,123	287	231	43	10
March 1 to 22	30	68	90	7	78	5

Information concerning Galicia is lacking.

The presence of rinderpest in Poland has alarmed all the countries of Central Europe, and two sanitary conferences have been held: one in Vienna in November, 1920, and the other at Brest-Litovsk in February, 1921.

On the other hand, great assistance has been extended to Poland to aid her in fighting the plague. Denmark sent Professor Jensen with fifteen Danish or Norwegian veterinarians and a subsidy of 50,000 crowns for the purchase of material. France sent two veterinarians with material and a supply of anti-rinderpest serum. Czecho-Slovakia and Hungary were represented also, and Germany, Austria and Norway offered their aid.

The Conference can not do otherwise than note with satis-

faction this spontaneous manifestation of solidarity which presents a timely demonstration of interest of a joint action of the civilized nations against the dangers that threaten the animal populations.

NOTES ON FOOT-AND-MOUTH DISEASE

Foot-and-mouth disease has existed permanently in Europe for nearly half a century, with periods of calm interrupted by epizootic outbreaks. The most varied sanitary systems have been utilized without success. The closing of frontiers is not sufficient in the absence of insurmountable natural obstacles, and even the presence of these is not an absolute guaranty. The example of Great Britain is striking in this respect.

In the interior of an infected country it is possible to achieve the eradication of the first centers of infection by the slaughter of all sick and exposed animals conditionally on the discovery of centers of infection on their appearance and the availability of a police and technical organization equally active.

The experiment that Switzerland has carried on in these latter times presents considerable interest. "Stamping out" has been applied under the most favorable conditions—a small country possessing a good administrative organization and an excellent veterinary service; general acceptance of the population of protective measures rigorously applied; very judicious use of the method. In spite of these exceptional conditions the experiment has failed. The system appears as practically useless in most circumstances, especially if succeeding reinfections are feared (presence of the disease in a neighboring country; numerous centers of infection already established, etc.).

The lack of sanitary police measures can be replaced only by the immunization of exposed animals.

To be practicable a method of immunization must be simple, cheap, and of general application. In the present state of our knowledge the processes of sero-therapy, sero-vaccination and vaccination seem alone susceptible of utilization.

The laborious researches carried on during the last twenty years in Germany, France and Italy have brought, in place of the foreseen practical solution, a number of useful indications. Perseverance in this path should be continued in spite of the difficulties encountered. The governments have understood all the interest of these studies. At this time experi-

mental study of the prophylaxis of foot-and-mouth disease is carried on officially in Great Britain, France and Italy.

The Conference will probably consider it desirable that, without interfering with the independence of investigators, relations be established between the various laboratories specializing this study, and that results already obtained be communicated as soon as possible, to be checked or to serve as the basis for further experiments.

NOTES ON DOURINE

Recent war happenings have resulted in numerous centers of infection of dourine.

In 1914 the disease was practically unknown in Central and Western Europe. In 1921 dourine is found in Poland, Germany, Czecho-Slovakia, Rumania, Belgium, France, Italy and Spain, as follows:

Poland (January), two centers of infection in the Governments of Lods and Warsaw.

Germany (February 28), 12 cantons, 89 communes and 144 stables in Prussia (Konigsberg, Mersebourg, Erfurt, Minden) and in Thuringia.

Czecho-Slovakia (March 17), Departments of Varasz, Pozeska, Zagreb.

Rumania (January 28), 8 departments, 157 stables with 286 affected animals.

Belgium (April), 18 stables in 12 communes, with 1 stallion and 16 mares affected.

France: Dourine is found only in Alsace, where it was imported during the German occupation. In April there were 152 stables having infected animals in 33 communes.

Italy (March 27), 6 provinces (Bergame, Farrare, Mantua, Pisa, Reggio of Emily, Syracuse), 11 communes and 14 stables infected.

Spain (February), 9 provinces (Avila, Burgos, Huesca, Logrona, Navarre, Santander, Teruel, Biscay, Saragossa), 43 infected stables with 27 solipeds dead or slaughtered.

It is certain that dourine has been spread throughout Europe by infected mares brought back from Russia by the movements of armies.

In Alsace dourine was recognized in July, 1919, in the ar-

rondissement of Selestat. A first investigation disclosed that ten stallions of the Strassburg stud and three stallions owned by a private party of Marekolsheim and 775 mares were infected in 64 communes of the cantons of Beufeld, Selestat, Marekolsheim, Ribeauville and Andolsheim.

In Belgium dourine was recognized in Flanders in March, 1920. Its origin was not determined.

It is to be considered that dourine may remain unrecognized for a long time; either that forms of atypical evolution are alone noted, or that affected mares are scattered in small numbers in the country.

The attention of veterinary forces must be drawn to the possibility of the appearance of dourine even in the absence of all reason for suspicion. The late discovery of known centers of infection leads to the fear that infected mares have been shipped out of these to other destinations.

It would be desirable that methods of prophylaxis and means of diagnosis be studied together by the various countries concerned. The remarkable results obtained recently by Canada furnish important indications in this regard.

EXCHANGE OF INFORMATION CONCERNING CONTAGIOUS DISEASES

Issuance of Sanitary Bulletins

The uncertainty of the real sanitary condition of the countries of origin constitutes the principal obstacle to the traffic in animals and animal products.

To protect themselves against an eventual danger all nations strike all doubtful importations with systematic prohibition. With reason we dread what we know not, and shipments from countries which do not supply precise information as to their sanitary condition are refused on a par with those from infected regions.

An exporting country therefore has every reason for giving information on the health of its livestock that guarantees the harmlessness of its shipments. This obligation is more imperative in regard to adjoining countries exposed in the absence of unsurmountable natural frontiers to neighboring contagion by the extension of infected zones.

The value and the import of information thus transmitted

are subordinated to two essential conditions. They must (1) be rigorously exact, and (2) be transmitted promptly.

(a) The exactness of sanitary information implies a permanent efficacious surveillance over all exposed animals. It presumes a complete sanitary organization; in other words, a veterinary police service giving all desirable guaranties, from the double viewpoint of the control exercised and of the competency of the personnel employed.

The all-embracing and permanent character of sanitary surveillance is evidently indispensable. These conditions are realized at this time in almost all the countries of Europe and in a few others. They are lacking more or less completely in others, especially in the colonies.

A graver circumstance is that the nosology of certain regions is not known exactly. Tropical diseases, for example, are badly defined and their etiology is insufficiently known. In the legitimate dread of a possible danger a number of prohibitions are promulgated which it will doubtless be found practicable to abandon in the light of further research.

Permanent control over all animals must be exercised by a learned and disciplined personnel. A contagious disease should be quickly diagnosed and its existence brought at once to the attention of the authorities. A veterinary sanitary organization can not be considered adequate unless it comprises a competent staff of scientists utilizing all scientific means of research.

To sum up: Sanitary reports must not only give more or less complete information; they must show the real sanitary state of the country for the period covered. It is by this essential condition that they will be of value from an international standpoint. Any incomplete report should expressly mention the fact that it is incomplete.

(b) Sanitary information must be exchanged promptly.

Indications in this regard vary according to the diseases considered. For certain diseases like rinderpest and foot-and-mouth disease, the notice of appearance should be immediate; all governments should be notified by telegraph. In the case of rinderpest this obligation must be extended to simple suspicion in all cases where an experimental diagnosis can not be made immediately. It must be agreed that this state of suspicion exists

for any affection resembling rinderpest that has not been identified with absolute certainty.

Afterwards it will be sufficient, for both rinderpest and foot-and-mouth disease, to publish information on the progress of the disease under the conditions hereinafter mentioned.

In a general way, and save in cases indicated above, information of a sanitary nature has not a character of absolute urgency and it may be usefully inserted in periodical sanitary bulletins. These should contain information related, on the one hand, to contagious diseases generally classified, such as contagious pleuropneumonia, sheep pox, rabies, glanders, dourine, anthrax, swine erysipelas, swine plague, hog cholera and avian pest, and on the other hand to all the special affections susceptible of transmission through an epizootic or enzootic type (piroplasmosis and anaplasmosis, contagious mammitis, Malta fever, swine pox, malignant strangles of the horse, influenza of the horse, etc.). The bulletins should give as much statistical information as possible concerning bovine tuberculosis, blackleg, and scabies of horses, sheep and goats.

The geographical division of the reported diseases will be sufficiently indicated by the mention of cases in provinces, departments or corresponding territorial divisions.

Statistical information, varying according to the diseases considered, should give in all cases the number, for each animal species, of the affected and exposed animals. In a general way figures given should comprise (a) the number of communes and premises still infected at the beginning of the period considered, and (b) the number of new centers of infection observed during this same period (communes, premises, and, if possible, the number, by species, of affected and exposed animals).

It would be very desirable that the sanitary bulletins of various countries follow a uniform or comparable style which would facilitate their perusal and the use of the statistical material. The adoption of a standard form by all the nations participating in the present Conference would be ideal. The periodicity of bulletins now published is very variable; they are published monthly, semi-monthly, every 10 days, or weekly. These variations render statistical comparison very difficult. It is to be hoped that the same periodicity be adopted everywhere.

In France for a long time the bulletins were published monthly. This method presented the grave inconvenience of not bringing to the knowledge of those concerned the changes occurring in the sanitary state with sufficient promptness. The weekly publication, afterwards adopted, had the other inconvenience of not permitting the preparation of exact monthly or even yearly statistics. For these reasons a bulletin appearing every 10 days has been chosen, or, more exactly, a tri-monthly bulletin, for periods terminating the 1st, 10th and 20th of each month.

Whatever method of publication is adopted, it is essential that bulletins be issued very promptly, six to eight days seeming sufficient for their preparation, printing and forwarding.

SANITARY MEASURES FOR EXPORTATION

Quarantine Station for Exportation

So far, countries importing animals or animal products have had to protect themselves against the dangers of contagion by appropriate sanitary measures applied on landing or on entry at the frontier.

In the case of animals, these measures comprise the "sanitary visit," consisting either of a simple clinical examination or in the use of certain rapid diagnostic processes (use of tuberculin or mallein). In addition "certificates of origin and health" are required, the value of which varies according to the conditions of their issuance. In fact, the "sanitary visit" of animals furnishes only very incomplete information. In all cases it permits only the discovery of affected animals, and the importers often have all facilities for eliminating those at the time of entry at the frontier and entering the exposed animals.

The requirement of quarantine for observation constitutes a heavy charge on commerce. It necessitates the construction of special buildings, well equipped, if we would avoid both accidents and contagion. Practicable for a few great ports, these installations can not be multiplied on the land frontiers, especially as the variability of commercial currents tends to make them useless in a short time.

In a number of cases the "sanitary visit" is not reliable even for detecting affected animals. The necessity of inspecting in

a very limited time a great number of animals (herds, train loads of important shipments) renders greater the uncertainty of the inspections.

Special methods of control are utilizable only in a few cases and then give only very insufficient guaranties. The ease with which the results of the tuberculin test are falsified by frauds is well known.

The necessity for numerous countries to multiply the ports of entry for livestock, with the aim of facilitating commercial transactions, tends to enfeeble the efficacy of a control that can not be usefully exercised at ports of small importance having a personnel insufficient in number if not in quality.

Again, considerations of another character intervene. Animals recovered from certain affections may remain dangerous for a long time. Others carry indefinitely virulent agents difficult or impossible to discover. For all these reasons control at the time of importation can give only relative guaranties and explains the fact that sanitary regulations of most countries provide that imported animals must submit to a more or less prolonged sanitary surveillance at destination.

It is also understood that importing countries hesitate to permit the introduction of animals of which the state of health can not be guaranteed with certainty, regardless of required inspections. In fact, the exporting country alone can gather all the elements necessary to the affirmation of the state of health of an animal. The "certificate of origin and health" can give all guaranties provided it is issued in good faith. In the first place, this certificate must be delivered under the responsibility of the Government, by duly qualified agents, themselves effectively responsible to their government. In the second place, the text of this certificate must indicate explicitly the character of the guaranties offered; it will attest, for example, that the animal or animals designated are free from such or such affection, and that they have not been exposed to the contagion of this or that other disease.

The fact that the issuance of such certificates will be practically very difficult in most countries can not be overlooked. It supposes, in fact, that the delivering agent knows the origin of the animals and the sanitary condition of the premises where they have been kept, and that he has also controlled the condi-

tions of shipment from the premises to the embarkment or at the crossing of the frontier.¹

These difficulties have suggested the creation of "quarantine stations for exportation," in which animals would be subjected to a prolonged inspection and to a series of controls permitting the certification that they are free from certain diseases. Great Britain at Pirbright has installed a station of this character. Exported bovines may be placed under surveillance, tested with tuberculin, and even immunized against epizootic abortion, hemoglobinuria, and, eventually, against other diseases.

It seems that this control can be exercised currently only for certain kinds of animals, breeders for example. It may still function while a general prohibition is promulgated by importing countries, exception being made in favor of animals having passed through the quarantine stations and thus offering exceptional guaranties. The surveillance exercised must include the embarkation, measures being taken to avoid all risk of contagion during the necessary operations and during the voyage.

This question seems to be withheld by the Conference in the common interest of exporting and importing countries, the conditions of control to be exactly determined. If it is admitted that quarantines of exportation are practicable only under exceptional conditions, there is need of consideration of guaranties that may be normally required.

The old formula of the "certificate of origin and health" is practicable and can have a real value only if it is correctly applied. The certificate will vary in its import according to the requirements of the importing country and the sanitary condition of the country of origin. It may mention that the animals are free from determined contagious diseases and, if need be, that they originate in regions likewise free. It should be issued by a veterinarian designated or approved by his government, having received precise instructions and being responsible for their execution.

¹In France a decree of the Minister of Agriculture dated December 31, 1920, prescribes that bovines originating in the Netherlands must be accompanied by a sanitary certificate attesting that the animals were free of tuberculosis, epizootic abortion, hemoglobinuria or hematuria, and contagious vaginitis, and that they came from premises free from such diseases. The Government veterinarians of the Netherlands have refused with reason to deliver these attestations, declaring that it was impossible for them to control the origin of the animals and for this reason to certify to the sanitary condition of the premises from which they came.

